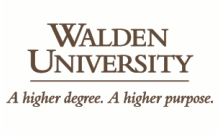

2021

Noncompliance with Regulations on the Use of Safety Helmets by Motorcyclists in Tamale, Ghana

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This is to certify that the doctoral dissertation by

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2021

Abstract

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by

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Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Public Policy and Administration

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Abstract

Motorcyclists' nonadherence to safety helmet regulations results in an increased risk of accidents, often leading to traumatic injuries or death. This noncompliance is prevalent in the rural and peri-urban areas of the developing world, particularly in Tamale, Ghana. The purpose of this qualitative case study research was to apply the theoretical framework of rational choice theory in the examination of motorcyclists' considerations in deciding whether to comply with government safety helmet regulations. Motorcyclists in Tamale were convenience sampled for observation and a subset recruited for interview. The study followed the qualitative case study approach by conducting observations and in-depth face-to-face interviews for data collection. Of the 4,711 observed motorcyclists and 24 motorcyclists subsequently interviewed, the majority did not wear a safety helmet. Additionally, the template analysis approach was used to code and analyze the interview data. Key factors in motorcyclists' decision not to wear a helmet largely stem from the discomfort of the helmet, impairment of riding, lack of effective enforcement, and the low level of safety helmet education. Based on these findings, it is recommended to aggressively disseminate motorcycle safety education programs, supplement law enforcement personnel, and implement new legislation to ensure 'no helmet no entry' into public places to encourage helmet use. Compliance with safety helmet regulations will minimize traumatic head injuries and deaths through motorcycle accidents, thereby preventing human and financial loss for the individual, family, society, and government and resulting in positive social change.

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Dedication

To the glory and honor of the almighty Allah, I dedicate this work for His mercy and grace. To the numerous motorcyclists in Tamale, in particular Ghana in general, I say riding without safety helmets kills, therefore wear your safety helmet and stay alive.

Acknowledgments

From the moment the idea was conceived until the completion of this dissertation journey, some people have worked directly or behind the scenes to make this feat a reality. Consequently, I take the opportunity to acknowledge my faculty and Dissertation Committee (Dr. Richard Joseph DeParis, Dr. Gerald Paul Regier, and Dr. Lydia Forsythe [URR]) for their professional guidance and support. I wish to render a special thanks to Dr. DeParis for his patience, dedication, professionalism, and commitment to quality as he guided me under his mentorship as Chair. God bless you, Dr. DeParis. I also wish to acknowledge Dr. Felix Longi, Dr. Abubakri, and ACP Owusu-Bempah for serving as an expert panel for the study and offering helpful feedback to improve the quality of the dissertation. To all the research participants, I appreciate your time and voluntary service.

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Chapter 1: Introduction to the Study

Introduction

Universally, motorcycle use as a means of daily transportation is often expeditious, cost-effective, and popular. Moreover, global motorcycle demand is projected to increase approximately 4.4% annually from current use (121.5 million motorcycles) by 2022 (Freedonia, 2018). In most developing countries, such as Ghana, motorcycles mostly augment traditional means of transportation for individual and commercial purposes; typically, motorcycle use is most prominent in rural and peri-urban areas of Ghana (Dinye & Ahmed, n.d.; Starkey, 2016). Given the prevalence of motorcycle use, Ghana governs the safety and operation of motorcycles through implemented road traffic and safety regulations. Specifically, the Road Traffic Act regulations implemented in 2004 are meant to protect the rider, passenger rider, pedestrians, and general road users from the potential risks (National Road Safety Commission of Ghana, 2019).

Although road traffic regulations require motorcyclists to wear protective safety helmets as a safety measure in Ghana, most motorcyclists, particularly in Tamale, disregard road traffic regulation and ride without safety helmets. Tamale, the administrative capital of the Northern Region of Ghana, West Africa, is where primary economic activities occur, including farming, hunting, cloth weaving, and trading. Tamale represents the third-largest city in Ghana, with a population of 360,579 people and a land space of 731 km² (World Population Review, 2019). Given Tamale's large population and prevalence of motorcycle use, the consequences of not wearing a safety

helmet while operating a motorcycle as a rider or passenger rider pose dangerous risks such as serious head injuries and even fatal accidents. Data from the US National Traffic Safety Administration (NHTSA, 2016) suggests that wearing safety helmets during motorcycle incidents saved 1,859 lives in 2015. Specifically, safety helmets were estimated to be 37% and 41% effective in preventing fatal injuries to riders and passengers, respectively (NHTSA, 2016). Therefore, my study was intended to explore the reasons for the non-compliance of road traffic regulations in Tamale.

A qualitative research approach of observation and interview was used to explore the phenomenon of non-adherence to the existing protective crash helmet regulations. Findings are expected to contribute to the formation of pragmatic policies and programs that would help promote the use of safety helmets among motorcyclists in Tamale. Consequently, this research would contribute to positive social change and, in effect, help reduce deaths and injuries resulting from helmet noncompliance.

Chapter 1 covered the background, problem statement, purpose of the study, and the research questions. Also, this chapter included the nature of the study, definitions, assumptions, scope and delimitations, limitations, and the significance of the study.

Background

Motorcycle use has become a popular form of transportation, especially in developing and low-income countries (Delhaye & Marot, 2015). However, the increase in motorcycle use raises road safety concerns. Craft and colleagues (2017) suggest that each year motorcycles account for 23% of crash-related deaths worldwide. Moreover, Craft et

al. (2017) posit that road traffic accidents (RTAs) involving motorcyclists without helmets account for 42% of deaths and 69% of severe head injuries for accident victims.

Motorcycles have become a major means of transportation for the majority of African citizens; particularly in the rural and urban areas, motorcycles provide maneuverability and accessibility to areas that cars cannot pass easily (Emiogun et al., 2016; Olubomehin, 2012). Further, many motorists use motorcycles due to their affordability and the bad road conditions in some parts of Africa (Dapilah, Guba, & Owusu-Sekyere, 2017). Increased use of motorcycles by a teeming population in most African countries, especially in the northern parts, has been accompanied by a spike in reported motorcycle accidents resulting in fatalities and serious injuries. For example, Nigeria is estimated to have an incidence of 41 RTAs per 1000, of which motorcycle accidents account for 50% of the RTAs (Emiogun et al., 2016).

Motorcycles offer a cost-effective and expeditious travel experience compared to more traditional automobile transportation, which can be overwhelmed by constant traffic gridlocks within urban and peri-urban areas of Ghana. It has also gained prominence in the rural areas due to ease of mobility and dexterity on poor road networks (Seidu, Mubarik, & Abdul-Lateef, 2017). In the Road Traffic Regulation of Act 683, Section 16 requires motorcyclists to wear protective helmets; any motorcyclist riding without wearing a protective helmet is considered to have committed an offense (Parliament of the Republic of Ghana, 2005). Upon conviction, a motorcyclist will be liable to a minimum fine of 100 penalty units (not to exceed 200 penalty units), to a maximum 9-

month term of imprisonment, or both fine and imprisonment (Parliament of the Republic of Ghana, 2005).

The above important road traffic legislation is often not adhered to with impunity. The World Health Organization [WHO](2018) database on motor traffic accidents in Ghana suggests that most motor traffic accident victims are aged between 15-44 years. This age range represents the most vibrant and economically productive population within Ghana and Tamale specifically. Moreover, RTAs that lead to death or serious injuries can consequently have large detrimental effects on the socio-economic status and sustainability of their families.

Fatalities and serious injuries resulting from motorcycle accidents can be reduced with a tacit effort on the part of motorcyclists to comply with the helmet use provisions of the Ghana Road Traffic Regulations (Atchulo, 2014). Not only will adherence to safety helmet use potentially mitigate deaths and injuries by 40% and 70%, respectively, but the economic burden placed on the Ghana government to provide associated emergency medical responses will be reduced. This reduced medical and economic burden will alleviate an already resource-constrained health infrastructure system. Importantly, reducing deaths and injuries will also minimize the real-time adverse effects of high medical care costs and emotional trauma placed on families of motorcycle accident victims (Aderamo as cited in Enu, 2015; Gopalakrishnan, 2012; WHO, 2018). Given this context, my study seeks to explore the reasons most motorcyclists in Tamale do not comply with the helmet use regulation despite the risk avoidance.

Problem Statement

Motorcycle accidents have become a major problem in Tamale. Specifically, non-compliance with protective crash helmet use, despite government regulations, can subsequently increase motorcyclists' susceptibility to death and injury (Seidu et al., 2017). The National Road Safety Commission of the Republic of Ghana (NRSC, 2017) statistics show in 2016, out of an estimated national population of 26 million, motorcycle accidents resulted in 2,084 deaths and 10,438 injuries. Additionally, the NRSC statistics indicate that in 2016, relative to 2015, the Northern Region saw a 34.9% increase in fatal crashes; motorcycle users were estimated to be at 20.9% higher risk compared to other road users in Ghana (NRSC, 2017). In view of these grim statistics, the NRSC has initiated a nationwide campaign on road safety aimed at educating the general public.

The literature reviewed for this study identified a number of factors responsible for motorcycle accidents resulting in death and injury. These factors include disregarding traffic regulations, speeding, riding while fatigued, riding while under the influence of substance use, and being distracted due to mobile phone use or other activities, leading to inattentiveness (Atchulo, 2014). However, from a qualitative perspective, none of the examined research provided cogent reasons for the non-compliance to protective helmet use government regulations by motorcyclists in Tamale. Consequently, this study aimed to complement existing literature on the subject matter by using a qualitative research method to better understand the problem. The qualitative research approach provided insight into the research problem from the motorcyclists' perspectives. The study would

also contribute to the existing body of knowledge by providing a conceptual framework for future studies on this research area.

Purpose of the Study

The purpose of this qualitative case study research was to explore why some motorcyclists do not comply with the government regulations requiring safety helmet use in Tamale. Leonard (2018) explains that case studies allow a detailed examination of a phenomenon, and the participant could be an individual, group, organization, town, or city. As part of the qualitative case study, unobstructed observations and structured face-to-face interviews with motorcyclists were conducted in the Tamale Metropolis to elicit their opinions related to the research questions.

Research Questions

RQ1: What are the considerations in motorcyclists' decision to wear safety helmets?

RQ2: What are the considerations in motorcyclists' decision not to wear safety helmets?

RQ3: For those who do not wear safety helmets, what considerations would make them decide to wear safety helmets?

Conceptual Framework

The conceptual framework of this study was derived from the rational choice theory (RCT) as championed by Smith (1976) in his inquiry on the "nature and causes of wealth of nations" (p.1). Smith's theory was further developed by neoclassical economics based on three key assumptions: "(1) individuals have selfish preferences, (2) they maximize their own utility, and (3) they act independently based on full information"

(Wittek, 2013, p.1). These assumptions imply that an individual does not decide without considering their own interest. Decisions are not made without the individual looking at the benefit that they will derive for themselves. Consequently, before making the decision, the individual will weigh the facts and, based on rational analysis, make a choice.

Based on this context, the decision-making process of motorcyclists in Tamale was examined to determine if whether their choices are in conformity and validated by the RCT. The main force of all rational choices is that of an individual, group, or organization's preferences, beliefs, and constraints. RCT is anticipated to provide a conceptual framework to supplement the current understanding of the research participants' decision-making process and choices.

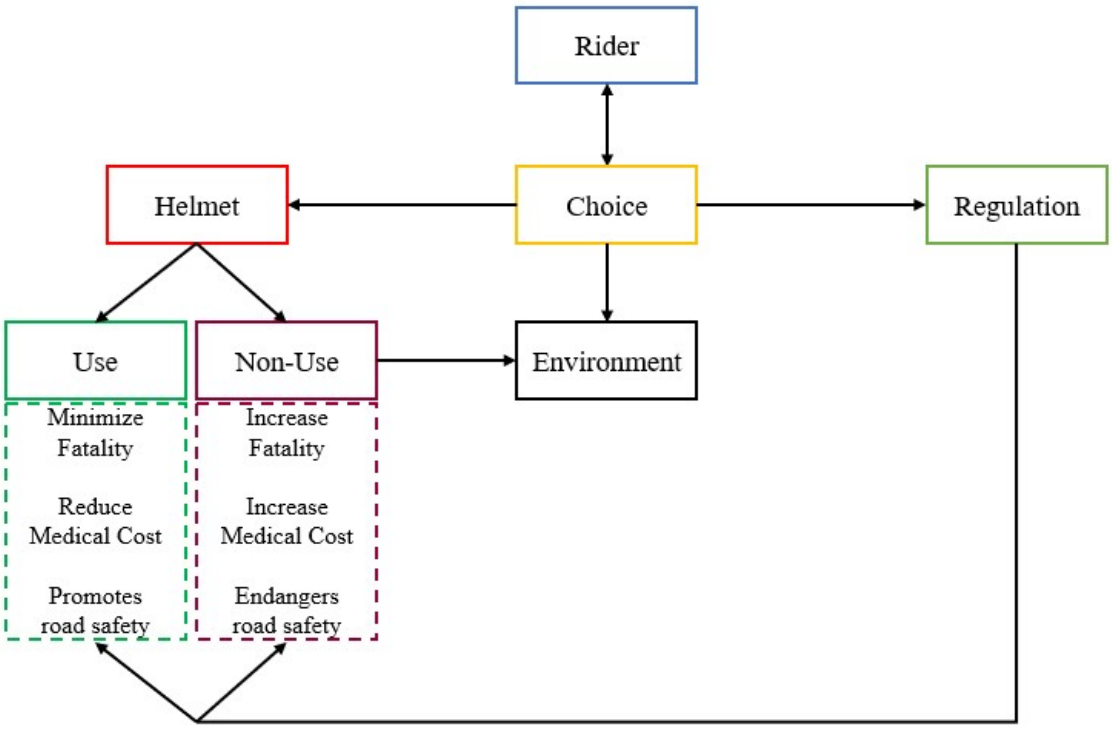
In view of this, the motorcyclist's world was considered as a system consisting of several components such as the rider, motorcycle, helmet, regulations, and the environment. The choice the motorcyclist makes to wear or not to wear a helmet had dire consequences on the rider, regulations, and the environment. The choice not to wear a helmet will increase the likelihood of serious injuries and deaths of the rider and potentially cause unnecessary damage to others in the environment. The choice to wear a helmet will promote rider safety and the general safety of stakeholders in the environment. Figure 1 shows the concept map for non-compliance with regulations on the use of safety helmets by motorcyclists.

The RCT was selected as a theoretical foundation for this study due to its potential to provide guidance related to the scope of study, assumptions, and concepts.

RCT is relational; therefore, understanding the motorcyclists' decisions will help target focused programs and policies to ensure the safety of motorcycle users in Tamale.

Figure 1

Concept Map on Noncompliance of Motorcycle Riders on Use of Helmets



Nature of the Study

The case study design was selected for this research because it permits a detailed exploration of the phenomenon of interest (Creswell, 2014). Moreover, the case study design is typically adopted when the aim is to understand people or situations over time (Creswell, 2014). This research design supports a qualitative research approach in which the goal is to understand, explore, and describe what people do in their natural settings

from their perspective in the context of their interpretation of the meaning (Ravitch & Carl, 2016).

The case study approach is only one of many qualitative research designs (e.g., grounded theory, ethnography, narrative research, and phenomenological research; Creswell, 2014). Specifically, the exploratory case study research design was chosen for this investigation as it will allow the researcher to better understand, from the perspective of motorcyclists in Tamale, the non-compliance with the Road Traffic Regulations (Act 683) of the Republic of Ghana regarding the wearing of protective safety helmets. In this study, a convenience sampling method was used to sample motorcyclists from the Tamale Metropolis. According to section 16 of the Road Traffic Act 2004 (Act 683):

> (1) a person who rides or is ridden on a motorcycle on a road shall wear a protective crash helmet of a type prescribed by Regulations. (2) a person who fails to wear a prescribed crash helmet in contravention of subsection (1) commits an offence and is liable on summary conviction to a fine not less than 100 penalty units and not exceeding 200 penalty units or to a term of imprisonment not exceeding 9 months or to both. (The Parliament of the Republic of Ghana, 2005, p.12)

Definitions

Motorcycle: A motorcycle is a motor-operated vehicle manufactured with a saddle or seat not meant to move on three wheels (Department of Motor Vehicles, 2016)

Motorcyclist: Any person who operates or is carried on a motorcycle, including either adults or children.

Motorcyclist environment: This environment is the space within which motorcyclists operate their motorcycles. This environment encompasses other road users (e.g., vehicles and equipment, pedestrians, the road, and animals)

Motorcycle safety helmet: The safety helmet is a standard protective covering for motorcyclists to wear that is engineered to reduce head injury during accidents.

Vulnerable road users: Road users who are most at risk on roads and in traffic, therefore considered vulnerable, include motorcyclists, elderly persons, persons with a disability, and children (OECD, 1998).

Road traffic regulation: This regulation refers to the Road Traffic Act - 2004 (Act 683) of Ghana (The Parliament of the Republic of Ghana, 2005, p.12).

Motorcycle accidents: These crashes may involve motorcycles either alone or with other environmental elements (e.g., road users, equipment, nature).

Penalty unit: The penalty unit refers to units established by the Fines Act of 2000 (Penalty Units, Act 572). The monetary value of a penalty unit stands at GH₵12.00 in Ghana or approximately $2.18 USD (Bank of Ghana, n.d. p.2).

Assumptions

It was assumed that typical costs of alternate transportation are high as a large number of motorists resort to the relatively inexpensive mode of motorcycle transportation for work and business in Tamale. Additionally, it was assumed that the majority of motorcyclists in Tamale have no formal training and consequently poses risks to other road users in Tamale. Furthermore, it is assumed that non-compliance with safety helmet regulations causes injury or death to accident victims, which can consequently

also place a financial burden on the families and government. Lastly, but importantly, it was assumed that research participants would answer research questions honestly.

Scope and Delimitations

The study was carried out in Tamale, the Northern Regional capital of Ghana. A primary delimitation of the study was the sample selection. The sample constituted a restriction in the sense that the sample was limited and restricted only to motorcyclists in the Tamale area of Ghana. Even though motorcycle riders from neighboring communities of Tamale participated in the study, restricting the study to Tamale was the delimitation.

Limitations

A potential limiting factor of the study was that the participants would not give honest answers. There was also a possibility that researcher bias would pose a limitation to this study. The inherent biases associated with face-to-face interviews and observations, self-serving biases of respondents, the fear of exposure to authorities, illusions of invulnerability of motorcyclists that can lead to biased responses, gender bias (i.e., the propensity of more males to respond than females), and suspicion arising due to covert observations by the researcher would affect outcomes of the validity and reliability of the study. These limitations were addressed by combining several research methods concurrently (e.g., observations and interviews) to achieve rigor and objectivity.

Significance

This study attempted to unearth the factors that promoted motorcyclists' noncompliance with safety helmet regulations in Tamale. Also, it would help policy formulation aimed at promoting compliance with regulations on the use of safety

helmets. In addition, the study would add to the body of knowledge in road safety and further serve as reference material for students, instructors, researchers, and general readers. Above all, understanding the factors that prevent motorcycle riders from using protective safety helmets would contribute to positive social change by informing the development of policies and programs to promote the use of safety helmets by motorcycle riders.

Summary

Motorcycles have become a major and useful means of transportation in the world, particularly in developing countries in Africa. As an emerging economy, Ghana has witnessed a significant rise in the use of motorcycles to move from rural areas to urban areas (and vice-versa). However, the increasing use of motorcycles also brings a higher prevalence of accidents with injuries and fatalities. Motorcycle accidents can be attributed to a myriad of factors, including, but not limited to, a disregard for regulations, speeding, intoxicated operation of a motorcycle, use of mobile phones whiles riding, and other road distractions. However, the disregard for regulations requiring the use of helmets erodes the safety and protection of motorcyclists against deaths and serious injuries.

The study purpose was to explore the reasons for non-compliance with regulations on the use of helmets in Tamale through qualitative research. An understanding of the factors that cause the disregard for Road Traffic Act (Act 683) will help in developing policy and implementing programs to ultimately protect and preserve the lives of motorcyclists and other road users in the road traffic environment. However,

to fully grasp the contributing factors that lead to motorcyclists' disregard of helmet regulations, the research questions must be exhaustively answered from the motorcyclists' perspective. To ensure the reliability and validity of the study, I used a number of research approaches, including face-to-face interviews and obstructive observations.

Chapter 2: Literature Review

Introduction

Over the years, motorcycles have become a globally recognized alternative mode of transportation, especially in developing countries, due to the ease of mobility and cost-effectiveness (Buckley et al., 2016; Turkson et al., 2013). Motorcycles present an affordable transportation option that can better navigate congested traffic conditions and also reduce parking issues, as witnessed in most major cities, particularly in Africa (Musah, 2018). Also, motorcycle use is linked with reduced energy expenditure and transportation during periods of petroleum price surges (Njiru, 2014). It is no surprise that in Ghana, especially in the northern regions, motorcycles have become a preferred transportation option. Despite the economic benefits and ease of mobility, motorcycle use involves risks such as death and head injuries due to the failure to use or improper use of helmets by motorcyclists (Musah, 2018).

The increasing use of motorcycles paired with limited use of safety helmets has made motorists more vulnerable to road traffic accidents. According to the National Road Safety Commission (NRSC, 2017), only 42% of motorcyclists in Ghana wear safety helmets, which could explain why motorcyclists accounted for the highest road traffic fatalities (21.0%) after pedestrians (39.5%) in 2016. Specifically, in Tamale, the administrative capital of the Northern Region of Ghana, the prevalence of motorcyclist deaths and injuries are particularly severe due to the high level of non-compliance with safety helmet regulations (Seidu et al., 2017). Specifically, the NRSC statistics show that in 2016, out of an estimated national population of 26 million, all road accidents resulted

in 2,084 deaths and 10,438 injuries (NRSC, 2017). Relative to 34.9% in 2015, Northern Region saw an increase in fatal crashes to 35.3% in 2016, with motorcyclists at 20.9% risk compared to other road users. Given these grim statistics, a nationwide campaign on road safety has been initiated by the NRSC aimed at educating the general public.

Past studies have identified factors known to be responsible for Road Traffic Accidents (RTAs) resulting in death and injury; for example, disregard for traffic regulations (e.g., speeding, improper passing), fatigue, bad roads quality (e.g., potholes), substance use, and distraction or inattentiveness (e.g., mobile phone use) can leave motorists vulnerable to RTAs (Atchulo, 2014; Kowi, 2015). With regards to helmet use by motorcyclists, few studies have sought to provide explanations for helmet non-use. Ranney et al. (2010) conducted research to assess motorcyclists' attitudes, norms, and behaviors towards safety helmet usage in a U.S. state with a limited helmet law; researchers found that only 32% of the participants reported always using a helmet and that non-use of helmets was attributed to bad attitudes, low education, lack of training on riding, and the perceived discomfort of helmet use. Similarly, Dennis et al. (2013) assessed the determinants of helmet use decision making among motorcyclists in the Dominican Republic; participants identified cost, lack of helmet access for passengers, and unattractiveness as the perceived barriers to helmet use. Other researchers identified traveling distance, helmet discomfort, and the type of motorcyclists' hairstyle as major factors determining the non-use of helmets by tertiary students in the Wa municipality in the Upper West region of Ghana (Musah, 2018). Additionally, motorcyclists in the Tamale Metropolis, participating in Seidu and colleagues' (2017) research, identified

some leading reasons for their failure to use safety helmets were impaired hearing ability, potential to induce headache, and the distance of travel (e.g., less likely to wear helmet in short commute).

Despite previous research efforts, none of the researchers examined the issue from a qualitative perspective to understand cogent reasons for the non-compliance to the safety helmet regulations by the motorcyclists in Tamale. Consequently, this study aimed to fill the gap and supplement existing literature on the subject matter using a qualitative research method. The qualitative research approach enabled the researcher to gain an understanding of the research problem from the perspectives of the research subjects. The study would also contribute to the existing body of knowledge by providing a conceptual framework for future research.

The main purpose of this study was to use a qualitative approach to explore the reasons why motorcyclists in Tamale do not comply with the regulations and laws requiring the use of safety helmets. As part of the qualitative case study, structured face-to-face interviews with motorcyclists and unobstructed observations were conducted in the Tamale Metropolis to elicit opinions and perspectives related to the research. In this chapter, the researcher presents the literature search strategy, conceptual framework, and a review of non-compliance to regulation on the use of safety helmets.

Literature Search Strategy

In the literature search process, a five-point strategy was adopted (Monash University, 2020). First, key concepts and terms with regards to the topic of the study were identified. Subsequently, relevant databases and resources to consult were selected.

Next, the various combinations of relevant search terms and concepts were entered in the selected resources' search function. Finally, the search results were reviewed and refined.

Indeed, a diverse approach was adopted in the literature search process by using widely recognized databases in the Walden Library (e.g., Criminal Justice Database, Dissertations & Theses @ Walden University, Health Services and Sciences Research Resources (HSRR), ProQuest Central, PubMed, SAGE Journals, and ScienceDirect) as well as Google Scholar to search for content related to the subject area by the use of search terms, concepts, and the combination of search terms (see Table 1). Other sources of references consulted in the literature review process included but were not limited to peer-reviewed articles from reputable journals, dissertations, books, government reports, technical reports, and encyclopedias. Additionally, the search process included consulting the World Health Organization (WHO) website, the Global Health Observatory Database (World Health Organization, 2019), and the NRSC databases (National Road Safety Commission, 2016). Relevant search terms were identified from the following concepts: *importance of helmet use, factors influencing motor riders non-use of safety helmets, what are reasons for the flouting of laws on the use of helmets by motor riders, why are helmets needed by motorcyclists, non-use of helmets by motorcyclists, factors determining the non-use of helmets by motorcyclists, causes of fatal motorcycle accidents, importance of motorcycles, importance of motorcycle helmets,* and *need for motorcycle safety gear.*

Table 1

Search Terms and Concepts

Search term 1	Search term 2	Search term 3	Search term 4	Search term 5
Reasons	Motorcyclist	Flout	Laws	Helmet
Factors	Motorbike riders	Disobey	Regulations	Crash helmet
Influence	Motorbike users	Neglect	Rules	Helmet use
Why	Motor riders			Crash helmet use
	Motorcycle riders			

Theoretical Foundation

This study was grounded in the RCT as espoused by Smith (1976) in his inquiry on the "nature and causes of wealth of nations" (p.1). Smith's theory was further developed by neoclassical economics based on three key assumptions: "individuals have selfish preferences, they maximize their own utility, and they act independently based on full information" (Wittek, 2013, p. 688). Therefore, these assumptions imply that an individual does not make decisions without considering their own interests. Decisions are not made without the individual looking at the benefit that they will derive themselves. Before making a decision, the individual is believed to weigh the facts and then, based on rational analysis, make a choice (Uzonwanne, 2016).

Assumptions of Rational Choice Theory

On the contrary, some scholars have criticized the sweeping assumptions attributed to rational choice, thereby resulting in "behavioral economics" (Wittek, 2013, p. 688). Choices are made based on exigencies of a given situation and not a fixed problem (Wittek, 2013). Consequently, there are different variants of the RCT based on how closely the neoclassical model assumptions are followed, resulting in a "thin" or strict interpretation using a neoclassical perspective versus a "thick" or relaxed

interpretation using a sociological understanding (Wittek, 2013, pp. 688-689). These perspectives differ on three dimensions: (a) the type of rationality, (b) preference, and (c) individualism assumptions (Wittek, 2013, pp. 688-689).

Rationality

Rationality, in neoclassical terms, refers to an absolute free mind to make rational decisions; rational beings make decisions fully, knowing the cost, benefits, and consequences of their actions without any hindrance (Wittek, 2013). Rational human beings make decisions after careful calculations and analysis of available options and thereafter make a choice for optimal satisfaction (Coleman, 1990; Wittek, 2013). Lindenberg (2001) proposed the social rationality model, also known as the "thick" model of rational choice. Granted that the Social Rationality Theory posits that people have a free mind to make rational decisions, the theory can equally be applied to motorcyclists' decision making based on the prevailing circumstances at a given point in time (Wittek, 2013).

Preferences. Preferences in the rational choice approach show the selfish nature of the individual. Selfishness, taking the form of greed and self-centeredness, makes people ignore rules for personal gain (Wittek, 2013). RCT preferences assume that human behavior may be influenced by the welfare of others (Wittek, 2013). However, rational choice gains are not limited to only economic gains but may also encompass emotional and self-actualization (Wittek, 2013).

Individualism. Individualism in RCT is focused on decisions the individual makes to maximize one's preferences. The assumption is based on the notion that societal

norms are dictated and shaped by individual, group, and institutional actions. Individualism is categorized into either methodological or structural individualisms (Wittek, 2013). Methodological individualism is characterized by decisions based on subjective or objective analysis. On the other hand, structural individualism has the option of making a choice or decision based on the "situational mechanism," "action generating mechanism," or "transformation mechanism" (Acheson, 2002; Kydd, 2009; Wittek, 2013, p. 689). An understanding of these two concepts is necessary for appreciating the decision motorcyclists make to either wear or not wear safety helmets.

Application of Rational Choice Theory

Preferences, beliefs, and constraints are the primary drivers of all rational choices for an individual, group, or organization. The RCT provides the theoretical framework to understand the decision-making process of motorcyclists in Tamale based on rationalism, preference, and individualism. Moreover, the RCT was selected as a theoretical foundation for this study due to its potential to provide guidance related to the scope of the study, assumptions, and concepts. The RCT is relational, thus, understanding the motorcyclists' decisions will help trigger focused programs and policies to ensure the safety of motorcyclists in Tamale. It is assumed that motorcyclists, both users, and non-users of safety helmets, are rational and usually calculate their choices and are, therefore, responsible for their actions. As rational beings, it is assumed that motorcyclists usually determine the potential negative (e.g., pain or punishment) and positive (e.g., risk avoidance or safety) factors associated with helmet use before riding the motorcycle. However, Tsebelis (1990) argues that clearly, decision-making is complex when

accounting for the processes involved in understanding principles of rationality and principles of action. Further, Lovett (2006) posits the rational choice approach contributes to developing straightforward causal explanations of social phenomena; specifically, he classifies social explanations into causal (i.e., causal mechanism with antecedents), functional (i.e., provision of a purpose), or intentional (i.e., driven by desires and beliefs).

The RCT framework is prominent given its flexibility to be used to generate novel predictions in a variety of contexts with varying levels of complexity (Green, 2002). Undeniably, the RCT has been used in a wide range of disciplines such as operations research, decision engineering, foundations of microeconomic theory, enterprise decisions (e.g., production, output, investment, and technological change), crime, education, deterrence theory, and international relations (Burns & Roszkowska, 2016; Hedström & Ylikoski, 2014). Additionally, Ahmad and Emeka (2014) indicated that the RCT aided in the development of other theories such as the Lifestyle and Routine Activities theory. However, RCT has garnered criticism in terms of unrealistic assumptions about human cognitive capabilities and dismissal of the importance of emotions in decision making (Adanali, 2017; Hedstron & Stern, n.d.). However, given the past success in the application to criminal behavior, RCT was selected to provide the theoretical framework to nonadherence to helmet use.

Hayward (2007) contends that RCT applied to understand crime, especially situational crime prevention (SCP), has significantly impacted contemporary crime reduction practice, which proponents claim is the most efficient and cost-effective

approach to contemporary crime situations. Although Hayward (2007) claims that RCT fails to understand the ultimate causes of human behavior (e.g., emotional, social, and cultural circumstances), RCT emphasizes methods to control behavior through rational inspiration. In other words, RCT provides a framework to administer and create systems to prevent criminal activities (Hayward, 2007). Further, Hayward claims that RCT is successful in reducing property or acquisitive crime but has limitations in preventing the tendency among many young persons who engage in certain criminal decision-making strategies which are byproducts of a series of expressive crimes (e.g., crimes including emotional elements such as anger, violence, hostility, or excitement). On the contrary, Farrell (2010) purports that RCT can be applied in the SCP context in relation to all criminal behavior, even criminal acts labeled as expressive or irrational.

Through the RCT perspective, potential law offenders consider the potential costs and benefits of their intended actions before deciding to engage in crime (Bentham, 1982; Juraev, 2018; Musah, 2018). In this regard, fear of punishment (costs) would detract people considering criminal behavior. Moreover, this fear of punishment established the basis for the deterrence theory in criminology (Bouffard & Wolf, 2007). Despite concerns that not all criminals act rationally based on strategic thinking (De Haan & Vos, 2003), it is anticipated that the RCT will provide a conceptual framework to supplement the current understanding of the research participants' decision-making process and choices. In view of this, the motorcyclists' world will be considered as a system consisting of several components such as the rider, motorcycle, helmet, regulations, and the environment. The choices the rider makes regarding helmet use can have severe

consequences on the rider, families, government, and the environment. The effects of the choice not to wear a helmet will increase the likelihood of serious injuries and deaths of the rider as well as unnecessary damage to others. Conversely, the choice to wear a helmet will promote rider safety and general safety of stakeholders. The RCT is anticipated to supply a conceptual framework to supplement the current understanding of the research participants' decision-making process and choices related to helmet use.

Key Variables and Concepts

Globally and within most urban areas of Africa, motorcycles have increasingly become a preferred alternative means of transportation partly due to wide-ranging factors such as inadequate public transportation, poor quality road infrastructure, low economic status of the populace, ease of driving experience, and minimum motorcycle maintenance (Dinye, 2011; Kumar, 2011; Olubomehin, 2012). The rise in motorcycle use has been correlated with an increase in fatal road accidents leading to the loss of precious lives and, in many cases, permanent disabilities to victims (Kumar, 2011; Olubomehin, 2012). The WHO (2015) Global Status Report on road safety reveals that a total of 1.25 million people are generally killed in road crashes, including motorcycles each year worldwide; as many as 50 million people are injured, with the highest road traffic fatality rates occurring in low-income countries. Corresponding with increased urbanization and modernization in many developing countries, road traffic deaths have also increased to the point that road traffic fatality has been identified as the foremost cause of death for citizens between the ages of 5 and 29 (Olubomehin, 2012; WHO, 2018).

As with many developing countries, motorcycle accidents have become a serious concern in Ghana, given motorcycles have become a major substitute for transportation in most urban and rural communities (Kudebong et al., 2011). Consequently, this issue has been reviewed by many researchers. The literature review covered content related to the regulation of safety helmet use, factors that contribute to motorcyclists' adherence or non-adherence to helmet use, the impact of motorcycle training safety helmet use, the impact of education level on safety helmet use, consequences of non-adherence to safety helmet use resulting from accidents, and cost measures that promote wearing protective helmets.

Regulation for Safety Helmets

Regulations on road safety and road traffic control are meant to ensure safer travel and adherence to road laws resulting in orderly conduct on roads. Generally, many countries have used regulations to maintain and achieve road safety and reduce motorcycle accidents. Híjar et al. (2012) posit that legislation and enforcement of regulations are key for achieving effective road safety. Consequently, to guarantee adherence to speed limits, use of protective gear, and driving without the influence of alcohol, there is a need for comprehensive regulation of traffic laws (Rolison et al., 2018). Additionally, researchers recommend law enforcement have adequate budgetary allocations as an essential factor for sustained road safety (Híjar et al., 2012; Rolison et al., 2018).

Embedded in many countries' laws for protective equipment are sections requiring protective helmet use. For example, the Road Traffic Act 2004 of Ghana (ACT 683) stipulates in section 16 as follows:

> (1) A person who rides or is ridden on a motor cycle on a road shall wear a protective safety helmet of a type prescribed by Regulation; (2) a person who fails to wear a prescribed safety helmet in contravention of subsection (1) commits an offence and is liable on summary conviction to a fine not less than 100 penalty units and not exceeding 200 penalty units or to a term of imprisonment not exceeding 9 months or to both." (Parliament of Ghana, 2004, p.12)

In the United States, regulations on motorcycle use are not federally mandated and can vary between states. Specifically, protective helmet use is compulsory in 19 states, compulsory with restrictions in 26 states, compulsory with conditions in 3 states, and not required at all in 2 states (Padway, 2018). Moreover, Híjar et al. (2012) reviewed U.S. road safety legislation and confirmed all states have laws requiring helmet use. However, 40.6% of these countries reported having inadequate enforcement, implying that law enforcement for helmet use is a difficult factor in managing road safety.

Peltzer and Pengpid (2014) reviewed helmet use and associated factors among motorcyclists in the Association of Southeast Asian Nations (ASEAN). Across ASEAN countries, a significant proportion of motorcycle drivers did not wear a helmet; specifically, helmet use ranged from 11% to 91%. It was found that the introduction of helmet use legislation for drivers and passengers resulted in significant increases in helmet use. The researchers also found a community intervention program on motorcycle

safety for teachers and students in schools in Laos and Thailand, subsequently leading to significant increases in motorcycle helmet use. The effectiveness of the enforcement of helmet laws in ASEAN countries was rated on a scale of 0 (*not effective at all*) to 10 (*highly effective*); on average, ASEAN countries received a 7.2 effectiveness score. Contrasted with Malaysia, which received the lowest effectiveness score of all ASEAN countries by receiving a 5, Brunei Darussalam received the highest effectiveness score by receiving a 10. Peltzer and Pengpid (2014), therefore, recommended stricter enforcement of mandatory helmet laws for two-wheeler riders (both drivers and passenger-riders).

Safety Helmet Non-adherence Factors

Motorcycle helmets decrease the risk of fatal injuries and death. In a qualitative study about motorcycle use, collision history, and beliefs regarding helmets, the majority of 26 adults in an urban Dominican hospital, who self-reported riding motorcycles often without wearing a helmet, were fully aware that helmets can protect them from a head injury and death during road traffic accidents (Dennis et al., 2013). Despite this awareness, many motorcyclists choose not to wear helmets. Numerous researchers have attempted to unravel the rationale behind some motorcyclists' decision not to wear protective helmets. Generally, physical discomfort was the main reason given for not wearing a safety helmet during motorcycle rides. For example, Dennis et al. (2013) reported in their study that most motorcyclists do not use helmets because they found helmets to be ill-fitting, unaffordable, irritating, uncomfortable, hot and suffocating, and affecting vision, among other issues. Similarly, in a study by Faryabi et al. (2014) evaluating helmet use by motorcyclists admitted to an emergency ward of a trauma

hospital due to a traffic accident, only 21.5% of the motorcyclists had been wearing helmets at the time of the accident; the most frequent reasons for not using a helmet were the heavy weight of the helmet, feelings of heat, neck pain, feelings of suffocation, and limitations to head and neck movements.

Additionally, researchers using a multiple factor evaluation established that "environmental factors, helmet use experiences and attitudes, and recalling a lower exposure to a road safety awareness (RSA) campaign" were among the reasons motorcyclists did not use helmets (Siviroj et al., 2012, p. 3289). Moreover, Dennis et al. (2013) found that short distances, appearances (e.g., hairstyle, unattractiveness), and cost of safety helmets were barriers to helmet use. Further, Musah (2018) also identified traveling distance, discomfort, and the type of 'hair do' as some of the major factors accounting for the non-use of helmets. Using univariate and non-parametric classification and regression tree (CART) techniques, Adnan and Gazder (2019) investigated the factors affecting helmet use in motorcyclists in Karachi, Pakistan. Using CART, the researchers found not only were a significant number of motorcyclists unlicensed but helmet use could be significantly explained by driving license status and road condition (example, rainy weather, hot weather, law enforcement presence, etc.).

Additionally, in a cross-sectional observation study related to helmet use in Southwest Nigerian communities, Babalola et al. (2017) found helmet use was extremely limited among both motorcyclists (4.3%) and passenger operators (1.4%), indicating the majority of the motorcyclists (95%) did not use a helmet. Moreover, Babalola and colleagues found significant relationships between the rider's age, sex, motorcycle engine

size, and helmet use compliance. Specifically, helmet use compliance was higher among motorcyclists aged 50 years or older compared to motorcyclists under 50 years of age. Despite these revealing and insightful findings, reasons for non-adherence to helmet regulations in Nigeria were not provided from the rider's perspective.

Safety Helmet Adherence Factors

The use of helmets is geared towards protecting the motorcyclist. There are several factors that could encourage a motorcyclist to wear a helmet. Indeed, the frequency with which motorcyclists wear helmets is prompted by the existence and enforcement of road safety laws (Hung et al., 2006; Wei, 2016). For example, rates of helmet use have changed many times in Louisiana, U. S. according to changes in helmet regulations (Louisiana Highway Safety Commission, 2016). With a mandatory helmet requirement from 1993-1999 in Louisiana, helmet use was at or above 96.7% compared to when helmet requirements were relaxed between 2000-2004, in which helmet use plummeted to as low as 46.4%. However, after reinstituting the universal helmet law in 2004, helmet use rose significantly from 57.7 to 99.3% in 2005 (Buckley et al., 2016; Louisiana Highway Safety Commission, 2014). Removal of legislation requiring helmet use results in low use of helmets. This observation is confirmed by several studies that demonstrate legislating universal helmet use increases the rate of helmet use. For example, Macpherson and Spinks (2008) narratively reviewed previous studies to assess the effects of helmet legislation on bicycle-related head injuries and helmet use; they found that some studies reported statistically significant decreases in head injuries following the implementation of helmet legislation compared with controls. Hence,

Macpherson and Spinks concluded that helmet use had a statistically significant increase post-legislation in all the studies reporting on helmet use legislation.

Motorcyclists resort to the use of helmets when they are aware of law enforcement presence on the road (Dennis et al., 2013; Musah, 2018). This notwithstanding, law enforcement officials in most jurisdictions, especially in the developing world, are predictable as such motor users find ways to avoid them (Dennis et al., 2013). Using a mixed-method approach to understand helmet use in Vietnam and Thailand, Hung et al. (2006) and Siviroj et al. (2012) found that young men were more prone to not wearing helmets than adults and that lack of law enforcement at certain periods and places, especially during the night, accounted for non-use of helmets. In a related study, Heydari et al. (2016) found a significant decrease in road traffic fatalities and morbidity rates in Iran two years after implementing safety interventions by traffic police; specifically, the death rate decreased from 38.2 per 100,000 in 2004 to 31.8 per 100,000 in 2007. The study further supports that traffic police interventions played a crucial role in the enforcement of traffic rules.

Education and Helmet Use

Helmet use is essentially meant to reduce head injuries and deaths resulting from road traffic accidents (Hung et al., 2006). Before the 1980s, the number of people killed in motorcycle crashes globally had increased dramatically. In the United States, for instance, motorcycle crashes peaked at 5,097 annual fatalities in 1980 (NHTSA, 2018). In the next two decades, the nationwide incidence of motorcycle fatalities decreased 62% from the peak in 1980, dropping to 2,106 fatalities per year in 1997 (NHTSA, 2018).

Although the drop in fatal motorcycle crashes can partly be explained by a decline in riding prevalence, a substantial part of the drop can be attributed to the widespread introduction of helmet laws, training programs, and public education campaigns over the period of two decades (Bednar et al., 2009; NHTSA, 2018). The National Center for Statistics and Analysis (2018) reported only 8% of motorcyclists were killed in states with universal helmet laws in the United States, compared to a national rate of 60% in 2016. The requirement for helmet use yielded 79.6% compliance in states with universal helmet laws as compared to 53.5% in states without or with flexible helmet requirement regulations (NHTSA, 2018).

Motorcycle Training

Motorcyclist education and training are the essential components of a comprehensive motorcycle safety program. Addressing the need for this training resource requires funding and administrative support to establish a motorcycle safety program consisting of curriculum standards, physical sites, instructors, training motorcycles, protective gear, and educational materials (Bednar et al., 2009). Quality motorcyclist education and training programs should be available and accessible to not only novices applying for their initial license but also current motorcyclists seeking to improve their knowledge and skills (Bednar et al., 2009). However, the ultimate effectiveness measure of motorcycle training programs is the impact on crash rates (Bednar et al., 2009). Therefore, attempts by several U. S. states and Canadian provinces to assess the impact of motorcycle training on the rate of deaths from crashes between 1980 and 1990 resulted in the mixed results displayed in Table 2 sourced from Bednar and colleagues' review.

Billheimer (2001) conducted an extensive evaluation of the California Motorcyclist Safety Program using trend analysis and matched-pair comparisons to isolate the impact of a state-wide training program initiated in 1987. Specifically, Billheimer found the rate of motorcycle crashes dropped substantially in California (72%) within the first 10 years of the program compared to the U. S. national average rate (55%) during the same period. Furthermore, using a matched-pair analysis revealed that the crash rates among untrained novice riders were more than double the crash rate of their trained counterparts for at least six months after the training, at which point riding experience begins to have a leveling effect on the differences between the two groups (Billheimer, 2001). In addition to lowering the crash rates among novice riders, research shows that formal training classes may also advance the use of safety equipment and discourage unpromising riders from becoming motorcyclists (Bednar et al., 2009). For instance, Fagnant and Kockelman (2015) found that motorcycle training was associated with increased helmet use among motorcyclists. While the study could not substantiate causality, the increased helmet use was attributed to the probability that the motorcycle training instructed and encouraged helmet use; further, motorcyclists who seek training are presumably more safety-conscious.

Training is an essential element in the safety and handling of equipment (e.g., motorcycles) and can be acquired through either formal or informal knowledge transfer. Ranney et al. (2010) argued that mere attendance in motorcycle training would not guarantee the use of safety helmets but that motorcyclists were likely to use safety helmets if they learned riding from a professional course. This disclosure implies that

before a potential motorcyclist attempts to learn how to ride a motorcycle, a comprehensive motorcycle safety program should be considered.

Table 2

Studies Evaluating the Effectiveness of Motorcycle Training

Year	Study author(s)	State	Information source	Conclusion
1980	Satten	Illinois	Phone interviews	Higher accident rate in trained group Higher violation rate in untrained group
1982	Jonah et al.	Ontario	Phone interviews & driving records	No difference in accident rates Higher violation rates in untrained group
1984	Mortimer	Illinois	Mail surveys & Site Interviews	Higher accident rate in the trained group No difference in violation rates
1987	Leung & Reding	Wisconsin	Driving Records	No difference in accident rates Higher violation rate in untrained group
1987	McKnight	Pennsylvania	Mail surveys & driving records	No difference in accident rates Higher violation rate in untrained group
1987	Rothe & Cooper	British Columbia	Phone interviews & driving records	No difference in accident rates Higher violation in untrained group
1988	New York State	New York	Driving records & mail surveys	No difference in accident rates No difference in violation rates
1989	McDavid et al.	British Columbia	Driving records	Lower accident rate in trained group Insignificant difference in violation rate
1990	Rockwell et al.	Ohio	Driving records	Lower accident rates in trained group Higher violation in untrained group

General Level of Education

The relationship between motorcyclists' level of general education and risk assessment is inconclusive. While some scholars believe that higher education translates into a higher premium on safety due to a better understanding of the risks involved, others believe that education does not make a difference. For example, Heydari et al. (2016) conducted an observational study involving 414 motorcyclists from Shiraz, Southern Iran; using logistic regression models, no significant association was found

between the education level of motorcyclists and safety helmets adherence. In contrast, an earlier study's findings based on Malaysian motorcycle drivers revealed that motorcyclists with higher education levels were more likely to use safety helmets than motorcyclists with lower education (Kulanthayan et al., 2000). Indeed, their study revealed decreasing compliance ranging from motorcyclists with a tertiary level education exhibiting the most compliance (63.9%) compared to motorcyclists with either a secondary level education (46.6%) or primary level education (28.6%). Similarly, Peltzer and Pengpid (2014) identified the barriers of safety helmet use in South-East Asia to include lower education as part of more comprehensive socio-demographics factors such as younger age, limited knowledge of the safety helmet laws, lack of safety helmet law enforcement, physical discomfort, type of road, traveling time (i.e., shorter distance), and safety helmet characteristics (e.g., quality, price, style, experience).

Additionally, Kiteywo (2017) conducted research to determine the crash characteristics, injury patterns, severity, and associated factors among commercial motorcycle users attending Kitale County Referral Hospital. Similar to other research, education was negatively related to head injuries; specifically, the majority of the crash injury motorcyclists had attained a primary or secondary level of education, with less than 5% of the crash victims reporting a tertiary level of education. In further support of the relationship between education and safety helmet use, Wadhwaniya et al. (2017) conducted both a self-report and an observation study in Hyderabad, India, that revealed motorcyclists with lower levels of education were at a higher risk of not wearing safety helmets compared to motorcyclists with more advanced education. Moreover, higher

educational levels were associated with a higher rate of safety helmet ownership. With this finding, Wadhwaniya et al. (2017) concluded that a motorcyclist's level of education had a greater impact on their level of awareness of their personal risk. The researchers, however, cautioned that education alone may not increase the use of safety helmets but may offer a conducive environment for helmet legislation and enforcement by increasing awareness and reducing political resistance.

Consequences of Safety Helmet Nonadherence

Globally, motorcycle accidents make up a significant percentage of injuries and fatalities among road users (Naci, Chisholm, & Baker, 2009). Dissanayake and Shaheed (2012) demonstrated that motorcyclists are more vulnerable than other road users; they found that although motorcycle crashes accounted for only 1.7% of total crashes in 2008, motorcyclists accounted for 12.6% of all fatal crashes. Further, significant relationships were found between motorcycle crash severity and safety helmet usage as well as other safety equipment. Factors such as speeding, lack of personal protective equipment (PPE), risk-taking behavior, drunk driving, underage driving, improper training, and failure to follow traffic rules have contributed to this rising trend. Researchers in Kakamega County in Kenya concluded that traffic-related accidents rose between 2005 and 2010 by 5%, mainly due to untrained and unlicensed riders (Luchidio, 2015). After the Kenyan government’s intervention in 2010, the implementation of strict measures on *boda* riders (i.e., motorcyclists), traffic-related accidents dropped by 7% the following year in 2011 (Luchidio, 2015).

According to Duku and Adwoa (2010), in countries where helmet use is not mandatory, the number of fatal injuries or death due to motorcycle crashes has dramatically increased. Based on data from the National Road Safety Commission of Ghana, annual road crash fatality by the motorcycle user class was reported at 3.5% between 2002 and 2005 (Duku &Adwoa, 2010). The majority of these fatalities were due to head injuries which could have been preventable if motorcyclists were wearing safety helmets. In another study, Ackaah and Afukaar (2010) reported that the northern region accounts for most (20%) motorcycle fatalities in Ghana. Reports in the metropolis indicate at least one motorcyclist not wearing a helmet is killed every fortnight, and the number of motorcycle injuries has reportedly increased in recent times. The majority of those involved in crash accidents are typically young men.

Motorcycle crashes also contribute to social and economic upheaval. Through a retrospective, cross-sectional cost study examining the economic burden of motorcycle accidents in the Bolgatanga Municipality in Northern Ghana, Kudebong et al. (2011) concluded that motorcycle accidents are fatal and constitute a high economic burden as well as a severe intangible cost (e.g., pain, grief, and suffering). In terms of the economic burden, Kudebong et al. (2011) estimated that costs resulting from motorcycle accidents accumulate to approximately $1.2 million USD annually; half of this estimate is directly attributed to accident-related costs (e.g., property damage and administration) and the other half is accounted for by casualty-related costs (e.g., medical costs, out-of-pocket expenses, lost labor, intangible costs, and funeral expenses). Similar to Duku and

Adwoa's findings (2010), most motorcycle accident victims were in their productive ages and men.

Underscoring the traumatic experience related to motorcycle accidents, Sebiawu (2014) described the encompassing nature of consequences in his study of the northern part of Ghana known as the Upper West Region in the Wa Municipality. Sebiawu (2014) identified at an individual level that the personal costs of motorcycle accidents include not only financial implications but also emotional pain and mental distress. It causes a major life change in the lives of accident victims. Unfortunately, there are also estimated public costs of motorcycle accidents, including medical costs, loss of productivity, loss of life, and loss of properties. Sebiawu concluded that motorcycle crashes create a burden on society by consuming public funds for emergency responses, emergency treatment costs, and insurance premiums. These claims were further supported by Sargazi and colleagues' (2016) findings revealing that the burden of riding motorcycles without wearing safety helmets extended beyond the individual motorcyclist or even the immediate family to include the general public. Sargazi et al. (2016) examined the economic burden due to road traffic accidents (RTAs) of patients admitted to a single center in south-eastern Iran; given an estimated 288 per 100,000 people vulnerable to RTAs, the economic burden was calculated as $589,448 USD, which accounted for 10.4% of total hospital expenses during the one-year study period. In other words, the money spent on RTAs in the hospital was 130 times more than the gross national income per capita. Additionally, the cost of each patient in a crash was 15 times more than the cost of an average patient of the hospital in other units.

Strategies to Promote Helmet Use

The utilization of legal ordinances and road safety laws provide effective leverage to promote helmet use adherence. For instance, Merali and Bachani (2018) conducted a four-year study in Cambodia in which hefty fines were applied to traffic offenses for non-adherence to safety helmet use laws; findings demonstrated a significant reduction in non-adherence, thereby reducing injuries and deaths related to motorcycle accidents. Further, researchers found a strong relationship between rider and passenger safety helmet use and thus recommended free helmet distribution as a viable strategy to increase safety helmets use among motorcycle users. Similar success was observed in Bastos and colleagues' (2005) study in which safety equipment use (e.g., safety belt; crash helmet) increased after the introduction of a new traffic code in Brazil that incorporated heavier penalties for non-compliance in 1998. Notably, the enforcement of the traffic code was more effective among motorcyclists across several years compared to non-users of seatbelts that only demonstrated a decline during the implementation year; this difference may be explained partly due to the heavier penalty applied for helmet non-use (i.e., about 75% of a minimum Brazilian monthly wage) compared to seatbelt non-use (i.e., about 50% of a minimum Brazilian monthly wage). The implementation of punitive legislation must be complemented with efficient surveillance and enforcement to reduce non-adherence of safety equipment use (Bastos et al., 2005; Merali & Bachani, 2018).

Despite strong empirical support for leveraging traffic laws to reduce motorcycles fatalities and injuries by enforcing helmet use, Wei (2016) argues that U. S. motorcyclist associations and organized coalitions have prevented regulators from passing universal

legislation on helmet use. Similarly, even with legislation, Adnan and Gazder (2019) noted the need to improve the attitude of traffic police and their image. In some contexts, traffic police need to have a more professional and stricter image in enforcing the road law and administering punishment to violators (Adnan & Gazder, 2019); it is important to note that non-compliance towards safety helmet use was related to corrupt or negligent enforcement from the appropriate authorities.

Alternatively, Wei (2016) advocates several strategies to promote the use of helmets by motorcyclists, including educating opponents of helmet use (e.g., motorcycle associations) with the scientific evidence as well as discussing potential optimisms bias effects. However, researchers have argued that education alone would not be sufficient to sustain a change in people's values, objectives, and potential biases (Wadhwaniya et al., 2017; Wei, 2016). Instead, Wei (2016) advocates for the implementation of choice architecture via several mechanisms that potentially balance the goal of helmet use enforcement without infringing on motorcyclists' core values (i.e., freedom of choice). Wei's proposal includes incorporation of a safety checklist into the education materials for motorcycle permit issuance, use of subtle messages encouraging helmet use in pre-ride checklists provided by motorcycle manufactures, production of motorcycle helmets by motorcycle manufacturers translating brand loyalty to safety habits, design changes to motorcycles (e.g., warning lights or sounds) alerting helmet non-adherence similar to seatbelt alerts, government subsidies for purchasing motorcycle with helmets, and public-private partnership with insurance companies to adjust premiums for motorcyclists based on helmet use Similarly, Adnan and Gazder (2019) suggest alternate options to increase

helmet use such as motorcycle design enhancements (e.g., side mirrors, helmet boxes), corporations' integration of helmet use into corporate safety measures with violations punishable as misconduct as well as requiring helmet use by visitors on-premises, and, lastly, widespread digital media-based awareness campaigns (e.g., interviews of actual accident victims, messages from doctors, celebrity endorsements).

Summary and Conclusions

The major themes from the review of literature delve into motorcycle accidents, causes, factors of non-adherence and adherence, road traffic regulations, and possible strategies for improving helmet use. Generally, there was more literature on the causes of motorcycle accidents. The literature reviewed showed that rider idiosyncrasy, distracted riding, disobedience of road traffic laws by motorcyclists and automobile drivers are some of the major causes of road traffic accidents. Among other factors, research indicates motorcyclists are more likely to wear a helmet based on length of travel, level of education, and strong presence of law enforcement. Furthermore, the literature shows motorcyclists refrain from helmet use due to affordability, feeling uncomfortable, inhibited hearing, and physical appearance.

However, little or no literature exists related to reasons motorcycle riders did or did not adhere to regulations for safety helmets in Tamale. This present study is aimed at filling the gap to understanding motorcyclists' rationale for nonadherence to helmet use. Guided by the RCT, it was expected that this study would inform necessary policy formulation to address the existing gap in the literature. To understand the phenomenon from the research participants' perspective, the qualitative approach was used to

investigate the subject using a combination of methods such as observation and interviews to triangulate the data to help achieve rigor and trustworthiness of study outcomes.

Chapter 3: Research Method

Introduction

Chapter 3 presents the research design and methodological approach and explores the series of research questions related to why some motorcyclists in Tamale, Northern Region of Ghana, chose not to wear safety helmets. This chapter describes and justifies the data collection and analysis methods planned in this exploratory research study. Potential ethical concerns arising from the research are discussed. Conducting a sound investigation requires rigor and veracity; hence, the research requires a sound research design. Accordingly, the validity and reliability of the data, as well as the potential methodological limitations, are discussed. Chapter 3 concludes by describing, justifying, and applying a set of criteria to assess the quality of the study. Chapter 3, therefore, seeks to demonstrate that the selected research methodology and study design are of value to the investigation (Pickard, 2007).

Road safety measures, such as proper use of safety equipment, are important mechanisms by authorities of any country to not only protect road users from injury and death but also to prevent property damage (Department for Transport, 2011). Lack of measures and regulations on road safety could lead to chaos, injury, and death for road users. Road safety regulations are geared towards making the roads free of accidents, obstacles, and obstructions; moreover, enforcement of road safety regulations can boost the confidence of all road users to use the road devoid of fear and panic (Jose, 2017). Road safety regulations proclaim the responsibilities of road users and consequent punishment for non-adherence (Alonso, Esteban, Montoro, & Useche, 2017). One

significant measure within the road safety regulations is the requirement for motorcyclists to wear safety helmets. However, due to motorcyclists' non-adherence to the use of safety helmets in Tamale, Ghana, many people suffer unnecessarily from severe injuries and the loss of life (Ackaah, & Afukaar, 2010). Therefore, the non-use of helmets by motorcyclists presents an enormous challenge to the city authorities and managers of road safety in Tamale, Ghana (Ackaah, & Afukaar, 2010).

The purpose of this study was to understand why some motorcyclists in Tamale, Northern Region of Ghana, did not use helmets despite the clear physical and financial risks. A lot of research has been conducted on factors responsible for motorcyclist's nonuse of safety helmets. However, there is scant research on reasons motorcyclists do not comply with regulations on the use of safety helmets. To address this gap, a qualitative case study approach was employed using multiple strategies such as observations and interviews to collect data.

It was anticipated that the outcome of the research would contribute to positive social change in many ways. Primarily, this research would aid in promoting helmet use to reduce motorcyclist deaths due to head injuries. In understanding reasons for non-adherence, the study would also provide firsthand feedback from motorcyclists to inform policy formulation and further assist manufacturing companies to design helmets that are high quality, comfortable, and affordable to enhance motorcyclists' adherence. Subsequently, beyond the direct human impact, potential economic benefits could be realized by relieving families of financial and emotional pressures imposed by the would-

be senseless accident. Similarly, the government would be able to spend already scarce resources on other critical areas of the economy.

Research Design and Rationale

The research design for the study was a qualitative case study. Case studies are suitable for understanding individuals, groups, communities, or institutions that show the existence of a problem as well as gathering information to allow the formulation of solutions or plans to address the problem. Case studies allow the researcher to ask exploratory questions (e.g., how, why) and are especially applicable for contexts in which the researcher has no control over the phenomenon (Yin, 2009). Case studies of motorcycle accidents and safety helmet non-adherence could lead to information applicable to addressing this issue globally. The problem of helmet non-adherence occurs in most countries. The in-depth data collected from this research could increase the protection of motorcyclists during accidents.

Research Questions

The main concepts that were to be addressed by the research were the motorcyclists' experience with riding and their adherence to the use of safety helmets, the rationale for riding motorcycles, the factors affecting adherence to the use of safety helmets, and the knowledge of regulations requiring the use of safety helmets. The RCT provided the theoretical framework for understanding the decision-making process of motorcyclists in Tamale based on rationalism, preference, and individualism. The study sought to address three main research questions, including:

RQ1: What are the considerations in motorcyclists' decision to wear safety helmets?

RQ2: What are the considerations in motorcyclists' decision not to wear safety helmets?

RQ3: For those who do not wear safety helmets, what considerations would make them decide to wear safety helmets?

These research questions were designed to elicit responses from the participants to indicate the factors that determined their use or nonuse of safety helmets. From the unique perspective of motorcyclists, the research aimed at better understand how non-adherence to safety helmet regulations contributed to motorcycle accidents.

Research Design Rationale

The qualitative research approach was used to understand the phenomenon of non-compliance with regulated safety helmet use by motorcyclists. Qualitative research was considered appropriate for studies that aim to understand and experience the "meaning" of a social phenomenon in its "natural setting" (Atieno, 2009, p. 14). The increasing rate of motorcycle accidents in the Tamale metropolis had huge implications for road safety and potentially demonstrated the recalcitrance of motorcyclists refusing to use helmets. Studies involving the qualitative approach do not require either hypothesis testing or new theory development (Lareau, 2012). At its core, qualitative studies provide an approach to identify, analyze, interpret, verify, and evaluate data leading to findings that can be used to validate values, practices, and beliefs related to the phenomenon (Hammarberg, Kirkman, & De Lacey, 2016). The essence of qualitative research was to

explore, describe, and explain a given social problem in its natural habitat. Therefore, by using a qualitative approach, this research sought to understand the reason for the non-compliance of motorcyclists in Tamale, Northern Region of Ghana, to the safety helmet regulations. Given the wide variety of techniques offered by qualitative research depending on the nature of the research, the study approach aimed at collecting data through observation and in-depth interviews to support the research rigor, trustworthiness, and applicability of the findings.

Role of the Researcher

In quantitative research, the role of the investigator is practically non-existent; however, in qualitative research, the role of the researcher is a tool for gathering information (Denzin & Lincoln, 2003). Consequently, the role of the researcher was to design and plan the study, acquire all necessary approvals and permissions (i.e., state institutions, IRB, and individual respondents), and develop a rapport with these authorities and potential respondents to gain the cooperation of all parties involved to increase confidence and trust. Overall, the role of the researcher in this study was to attempt to understand the thoughts of the research participants (Sutton & Austin, 2015). The researcher must overcome potential participant barriers to encourage respondents to share insight into discussing content they deem personal and private.

In qualitative research, the role and objective of the researcher as a data collection tool should be made clear; any of the researcher's personal biases, assumptions, and values must be identified to safeguard against any ethical issues (Reid et al., 2018). Factors that could serve as potential bias in this study included the fact that some of my

family, friends, and subordinates own and use motorcycles in Tamale, Northern Region, Ghana. The likelihood of these three groups of people (i.e., family, friends, and subordinates) to not give honest and accurate answers was high, thus heightening the risk that social desirability bias would affect their responses. To address this potential source of bias, the researcher did not have any personal relationship (i.e., family, friends, or subordinates) with the potential study participants that could serve as a point of bias to the study results. To further reduce the chances of researcher bias in this study, the researcher made sure that the research design process, through data collection and analysis, was subjected to peer review. As the research was not conducted within the work environment of the researcher, there was no conflict of interest as far as the study was concerned. In the data collection process, the researcher did not offer incentives to research participants apart from providing them with 20 Cedis (i.e., the equivalent of $4 USD) for snacks as incentives have the tendency to introduce bias (Pogarsky, Roche, & Pickett, 2017; Reid et al., 2018). Specific to this research, the researcher's role was defined within each component of the study, including data collection and analysis.

The researcher collected data through observations and interviews. After data collection, the researcher organized the data for coding. The researcher conducted data analysis after data collection by organizing the data for coding. Data determined to be incomplete was to be used to identify and contact participants for re-interview. The researcher also coded the responses to each question and recorded the results using the Microsoft Excel spreadsheet. From the data analysis, the researcher extracted relevant findings, draw useful conclusions, and made recommendations for positive social change.

Methodology

The research method section of this study encompassed the study method, participant selection (population and sampling), recruitment process, instrumentation and measurement, data analysis, issues of trustworthiness, and ethical procedures. Detailed discussions were provided on the qualitative approach, the sample size, and the sampling method. The research method is based on the qualitative research approach. The qualitative research approach or design is exploratory in nature and geared towards understanding social phenomena in its natural setting (Jameel, Saqib, & Majid, 2018). This is achieved by the use of the research methods such as observations and interviews. Qualitative research methods are viewed by some social quantitative scientists to lack rigor and trustworthiness (Hammarberg, Kirkman, & de Lacey, 2016). Therefore, by triangulating these three qualitative data collection methods, the researcher expected to achieve validity, rigor, transferability, and acceptable outcomes which can be generalized and applied in any part of the world (Fusch, Fusch, & Ness, 2018).

In this research, observations of motorcyclists were conducted in four different locations in Tamale. As the principal instrument, the researcher took photographs of riders wearing or not wearing safety helmets. Subsequently, the researcher stopped taking pictures and invited motorcyclists to participate in face-to-face interviews immediately at the location of the observation. The researcher collected data with the aid of an observation checklist, camera, and notebook. Next, the researcher gathered data through face-to-face interviews with participants who agreed to the interview. This included explaining the consent form to the respondents, familiarizing them with the research

problem, and obtaining voluntary consent to either participate or not to participate. The researcher collected data with the aid of an interview guide, notebook, and a voice recorder. Lastly, the researcher selected documents from databases of organizations such as NRSC, DVLA, and the Ministry of Transport. These agencies have an open access policy for their websites, and the researcher intends to access these databases without officially writing to them except where such documents are restricted. Documents retrieved were coded, themes identified and clustered for interpretation. Walden University's Institutional Review Board (IRB) approval number for this study is 12-15-20-0608330

Population and Sampling

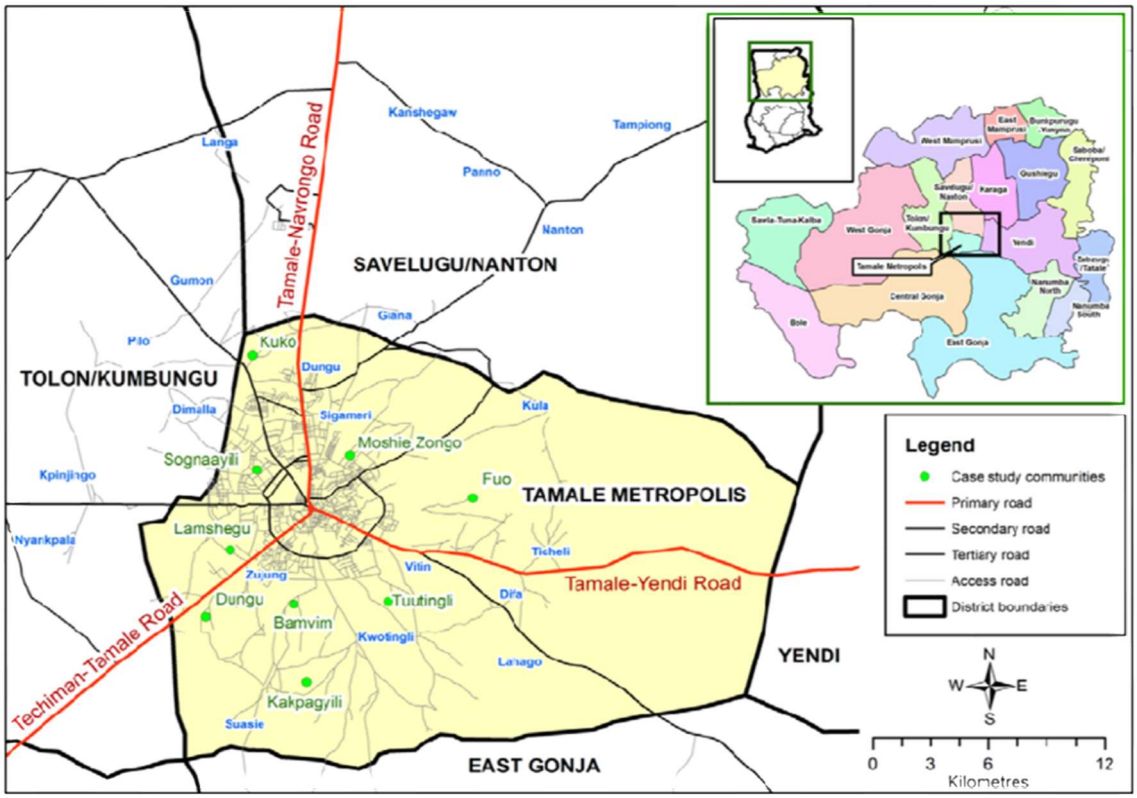
Population

A population is a category of a group of people, objects, articles, or measurements (Alvi, 2016; Guest, Namey, & Mitchell, 2013). The population of this study will be composed of motorcyclists in Tamale, the administrative capital of the Northern Region of Ghana. Tamale is a metropolis with over 360,579 people (World Population Review, 2018). The primary occupations of the citizenry are farming and trading. The estimated number of poor persons in Tamale is 54,091, and the incidence of poverty is 24.6% (Ghana Statistical Service, 2015). The level of poverty in Tamale is evident by the presence of local mud houses amid modern houses. Tamale has a well-developed network of roads with the main means of transportation in the city occurring via motorcycles and tricycles (Association for Safe International Road Travel, 2014). Motorcycles and tricycles are used by a wide variety of citizens in Tamale regardless of

age, gender, or socioeconomic status. The study population included motorcyclists of all ages, genders, employment status, and socioeconomic status; however, participants recruited for the interview were required to be at least 18 years of age and literate in the English language. The map of the location for data collection through observation is represented in Figure 2.

Figure 2

Map Showing the Study Area



Note. Adapted from "Environmental Sanitation Dilemma in the Tamale Metropolis, Ghana" by P. Napari & P. B. Cobbinah, 2014. International Journal of Social, Human Science and Engineering Vol:8 No:1, p. 229.

Sampling

Sampling is a technique by which a sample or subset is chosen from a defined population for the research (Alvi, 2016; Guest, Namey, & Mitchell, 2013). However, Gentles, Charles, Ploeg, and McKibbon (2015) described sampling in qualitative terms as the collection of data from different data sources to support research. Participants were recruited via convenience sampling. Convenience sampling is a nonprobability sampling method, which affords the researcher access to the target population due to availability, proximity to the study setting, convenience of time, and willingness of the target group to take part in the research (Etikan, Musa, & Alkassim, 2016). Concerning the study questions, both motorcyclists who wore safety helmets and those who did not wear safety helmets were observed and recruited for interview. In this research, children that were under 18 years of age were not sampled for interview for ethical reasons.

The sample size for the in-depth, face-to-face interview was in the range of 12-24 participants or until saturation was reached; sampling will ideally lead to approximately equal numbers of motorcyclists who wear or do not wear safety helmets. Even though using figures to determine data saturation is not applicable to all research problems, codes and meaning saturations are expected to be reached between the ranges of 12-24 interviews (Hennink, Kaiser, & Marconil, 2017). Guest, Bunce, and Johnson (2006) indicate that data saturation could be reached in as few as six interviews. Moreover, Fusch and Ness (2015) also provide guidance that data saturation can be determined when there is “no new data” and “no new themes” (p. 1409). Guided by this expertise and experience, the selected sample size was anticipated to be sufficient to reach data

saturation and yield a depth of understanding required for the phenomenon. Unlike saturation criteria marking an end to the interview process, data saturation for observation was attained by the researcher triangulating each data collection method with interview data. Fusch and Ness (2015) intimate that triangulation is another way data saturation can be reached in qualitative research. Data from observation assisted in triangulating the data from interviews to achieve some level of rigor and trustworthiness.

Data Collection

Data collection is an important milestone in the research process and, if planned or conducted inadequately, could mar the credibility and authenticity of the outcome (Peersman, 2014). Ravitch and Carl (2016) listed a range of data collection techniques for gathering data in qualitative work to include, but not limited to, "interviews, observations/field notes, focus groups, questionnaires, documents/archival data, and participatory methods" (p. 146). In view of the study purpose, motorcyclists were identified by observation and recruited for interview. Interviews were completely voluntary at the respondents' acceptance to participate. Additionally, to ensure ethical, credible, and valid study results, known subjects (e.g., family, friends, or subordinates) of the researcher were not recruited to participate. All volunteers were required to sign an informed consent form before they could participate in the study. The discretion to select the place of the interview was the responsibility of the researcher, and an interview was conducted immediately after the respondent accepted to participate in the research at the observation location. The researcher selected a suitable and conducive place at the point of observation to conduct the interview. The selected interview location was a quiet area

devoid of noise and distraction (Driscoll, 2011; Oltmann, 2016). The researcher arranged one office table and two chairs for the interview. The data collection instruments and approaches are discussed.

Instruments

The research instruments that were used to aid data collection and analysis included an observation checklist, field notebook, camera, interview guide, voice recorder, and Microsoft Excel spreadsheet. The observation checklist was a guide used by the researcher to assist in identifying motorcyclists' helmet use, among other characteristics. The field notebook was used for recording observations in the field during data collection and aided the researcher later to recollect events as they unfolded during the data collection process. The camera was used to take photographs of riders to improve recall of events as they unfolded in the field during the observation process. The interview guide consisted of questions to guide the researcher in the face-to-face interview. The voice recorder was used for recording voice data and used to record the interview with respondents to assist in subsequent voice transcription. The Microsoft Excel spreadsheet was used to record, organize, and code data.

Data Collection Techniques

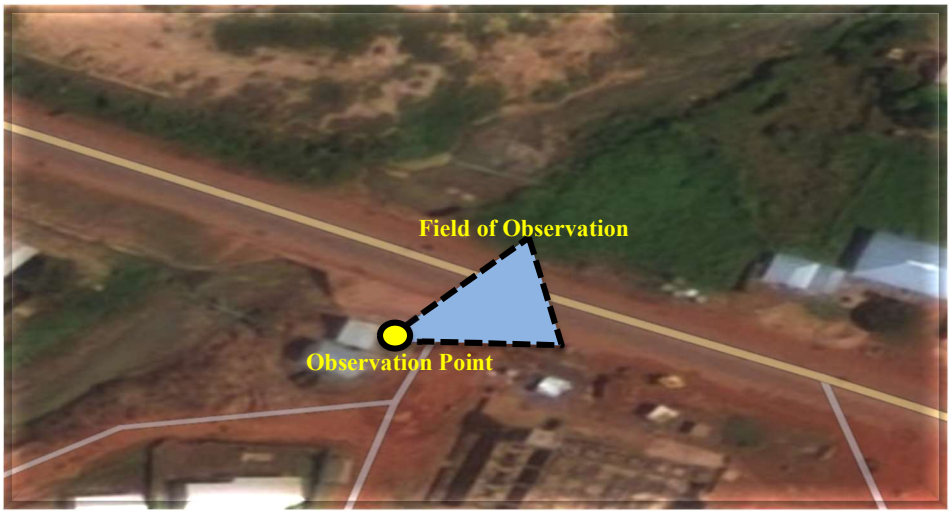
Data was collected using three different data gathering techniques, including observation and in-depth interviews. Through observation of the motorcycle riding scenes in Tamale, potential participants were invited to participate in the in-depth interviews.

Observations

Observation as a research strategy requires a skillful blend of experience and a technical eye to identify information with or without the research participants' knowledge; in other words, observation could be either overt or covert (Strudwick, 2019). In either scenario, the researcher could be a participant, an observer, or a participant observer (Strudwick, 2019). For this study, the researcher played the role of an observer in a covert data collection mode. The purpose of the observation was twofold. First, motorcyclists who wear or do not wear helmets were observed for data collection. Second, some motorcyclists on the routes were recruited for a face-to-face interview.

Figure 3

Yendi Road



Observations occurred at four major roads within the Tamale metropolis, including Yendi Road, Techiman Road, Kumbungu Road, and Bolgatanga Road. Specific sites for the observation included the Vittin Central Mosque on Yendi Road (see Figure 3; Google, n.d.-a), the Dungu Ghana Oil Company Limited Gas Station on Techiman

Road (see Figure 4; Google, n.d.-b), the King David Spot on Bolgatanga Road (see Figure 5; Google, n.d.-c), and the Shell Gas station on Tamale-Kumbungu Road (see Figure 6; Google, n.d.-d). The satellite images provided display the four observation locations and indicate the observation point and field of observation. The observations were unobtrusive and non-participant by nature, given the relative location of the discreet observation points. The position of observation was selected to afford the researcher full view of the individual motorcyclist without the motorcyclist seeing or knowing they were being observed.

Figure 4

Techiman Road

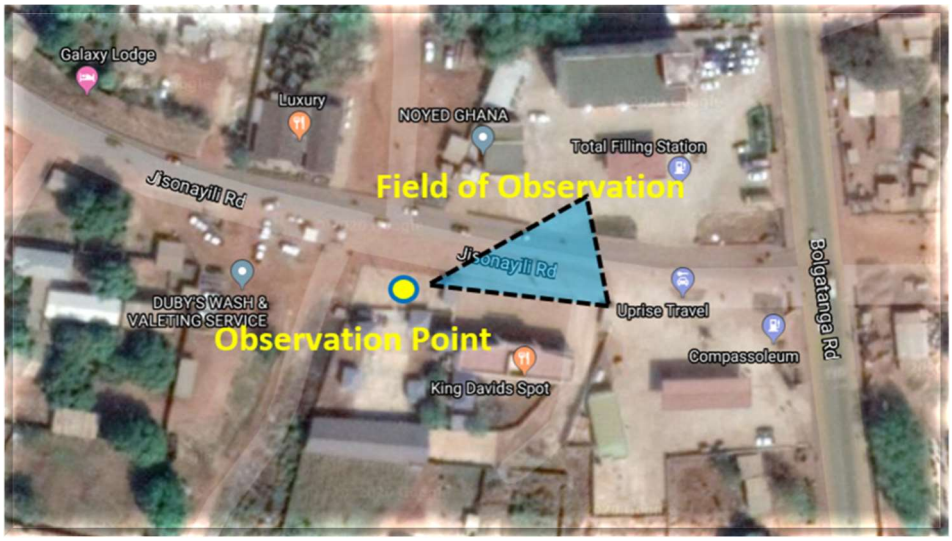


Figure 5

Bolgatanga Road

Figure 6

Kumbungu Road

Observations were conducted four days a week to include three observations during weekdays and one observation during the weekend (i.e., Monday, Wednesday, Friday, and Sunday). Each of these days was dedicated to the observation of a particular location of the four identified roads (i.e., Yendi, Techiman, Kumbungu, and Bolgatanga Roads). Each day, covert observation was conducted for one hour consisting of 30 minutes in the morning and 30 minutes in the afternoon. The morning session of covert observation commenced at 8:30 a.m. and end at 9:00 a.m. GMT; this time period was selected because it was the business rush hour for motorists. Similarly, the afternoon observation session commenced at 4:30 p.m. and end at 5:00 p.m. GMT; again, this time period was selected because it was the time most motorcyclists were returning home from their places of work and would afford the researcher ample opportunity to observe these motorcyclists. More importantly, observations were completed on days that law enforcement was not visibly stationed on the roads. The identified days were selected to achieve the maximum number of motorcyclist observations in their natural setting without any influence by the presence of law enforcement.

Subsequently, the researcher stopped the covert observation and photographing of motorcyclists in order to invite some motorcyclists to participate in face-to-face interviews immediately at the point of observation. Motorcyclists that either wore or did not wear safety helmets were identified as potential participants for the in-depth interview. These motorcyclists were not necessarily the same ones that were observed since those observed were just passing the point of observation and could not be stopped. However, for every 10 motorcyclists who stopped at the gas station or mosque to buy fuel

or transact business, the researcher invited one motorcyclist to participate in a face-to-face interview. Before the invitation for the motorcyclist to participate in the interview, I requested their consent. The potential respondent who agreed to participate in the research were taken for an interview immediately within the location of observation where office space was provided for the interview. The contacts of respondents were collected without recording their names for a follow-up to clarify some responses of the participants if necessary. The researcher did not make any follow-ups due to due diligence. At each location, the researcher invited 10 motorcyclists to participate in the face-to-face interview; in all, a total of 40 motorcyclists were invited for the interview. However, only 6 out of each group of 10 motorcyclists at each location invited for the interview agreed to participate in the research. In all, 24 motorcyclists agreed and participated in the face-to-face interview enabling data saturation to be attained. Data saturation is expected to be reached at a point in observation where no "new data" or "new themes" emerge (Fusch & Ness, 2015). At the point of observation saturation, the researcher will cease observation.

In-depth Interviews

In-depth interviews are face-to-face interviews with study participants that occur on a one-on-one basis aimed at understanding their experiences, knowledge, and perspectives on certain social phenomena to which the researcher requires some answers (Steber, 2017). In-depth interviews could either be a physical one-on-one or take place via telephone; either way, the objective is to gain firsthand insight into the phenomenon from the perspective of the study participant (Ravitch & Carl, 2016; Steber, 2017). In-

depth interviews afford the researcher the rare opportunity to gain insight not only into the verbal communication of the study participant but also enhance the chance to observe the non-verbal communication of the study participants (Ravitch, & Carl, 2016). In this study, face-to-face interviews were used to collect more in-depth data from motorcyclists that either wore or did not wear a safety helmet. The researcher moderated the interview to focus on the study purpose and research questions using the interview guide (see Appendix B). Guided by Guest and colleagues' suggestion (2006) that data saturation could be attained in as few as six interviews, data collection via in-depth interviews will continue until theoretical saturation is reached.

The interview guide addressed the main study concepts such as the motorcyclists' experience with riding and their adherence to the use of safety helmets, their rationale for riding motorcycles, the factors affecting helmet adherence, and their knowledge of safety helmet regulations. A preliminary set of questions was developed directly from the study purpose and three study questions as well as insight from previous literature, which helped shape the form and style of questions. Additionally, some questions were adapted from the interview guide based on a study on motorcycle helmet adherence among higher education students in the Wa Municipality (Akpade, 2019).

Interview questions were reviewed by an expert panel composed of two doctoral-trained experts and one master's trained practitioner; their feedback was incorporated into the interview guide. Specifically, the experts include: (1) a senior research fellow and lecturer from the Livelihoods International and Rural Development; (2) the director of the Institute for Interdisciplinary Research and Consultancy Service (University for

Development Studies, Tamale); and (3) an Assistant Commissioner of Police, Regional Commander in-charge (Motor Transport Traffic Department in Tema Region, Ghana) with an MBA in Health Service Administration and an MA in Governance and Leadership. A sample request letter inviting this expert panel to review the observation checklist and interview guide is attached in Appendix C. In addition, prior to data collection, the researcher conducted a field test run of the interview questions with a pilot sample of motorcyclists representing the population of research participants to help refine the questions for the actual data collection. The field test assisted in ascertaining the accuracy and ease with which the interview questions were understood by the research participants.

Once identified for recruitment to participate in the face-to-face interview, the researcher described the research study to the participant and sought their consent. Once consent was granted, the researcher invited and requested the motorcyclist to participate in the study. When identified potential participants agreed to engage in the study, they were given the informed consent form. The informed consent form was read by the researcher to the participants explaining the participants' rights and benefits. If an identified motorcyclist agreed to participate in the study, the participant was taken for the face-to-face interview immediately at a location provided by the researcher at the point of observation. One office table and two chairs were arranged for the interview at an arranged selected place closed to the observation point. Interviews only involved one participant at a time to enable a sense of privacy that encouraged respondents to provide honest and true answers devoid of any third-party influence or bias. Attached in

Appendix E are letters of cooperation that were signed by the various gas station and mosque Manager/Imam. At the end of the interview, the participant was given an amount of 20 Cedis (i.e., equivalent of $4 USD) as a token of appreciation. Throughout the interviews, an audio recorder, a field notebook, and the interview guide were used to help capture the details and context of responses. Beyond the interview guide, follow-up questions were asked based on conditions and responses received from the interviewees. The entire interview process was conducted in English (i.e., the official language for doing business in Ghana), and each session was conducted within a duration of 30 minutes.

Data Organization Techniques

Clear data organization fosters a more effective process to reference the data elements. Therefore, a Microsoft Excel spreadsheet document was created for each data collection technique, including data elements from the observations (e.g., helmet status, demographics, road characteristics) and in-depth interviews (e.g., participant demographics, motorcycle riding characteristics, knowledge of regulations). Similarly, after the data analysis was completed, each data collection occurrence was recorded in the respective spreadsheets. The interview audio recordings were transferred to the researcher's personal, password-protected computer for transcription via manual conversion. Similarly, recorded picture data from the field observations were transcribed manually.

According to Peersman (2014), optimal data organization for accessibility and evaluation requires consistent data collection, recording, security and storage, and audits

of data and movement of data. Data was manually organized into manageable cases for coding and interpretation. Subsequently, transcribed data were coded to identify and interpret themes and patterns. Data securely stored in the researcher's laptop was password-protected and further stored in an external hard drive which was also password-protected. Also, the researcher's laptop was locked and secured in his room in his personal residence to enhance the security of the data. Data auditing was achieved by reviewing the data several times and removing incomplete or invalid data.

Integration of data was done by complementing the interviews with information from the observations to gain a better understanding of the phenomenon. In this aim, observations were conducted, and potential participants were selected for the interview. Outcomes of codes for observation and interview were aggregated and later compared in the analysis phase to determine whether the patterns from the two data collection approaches were similar. The researcher relied on the combining and connecting approaches for data integration (Clark & Ivankova, 2016). Specifically, the researcher achieved data integration by combining the observation and interview sets of data after data collection. This helped enriched data interpretation and better appreciate the outcome of the study.

Data Analysis

Given the defined structure of data organization, the data analysis phase primarily focused on thoughtfully organizing and identifying themes and patterns recorded for coding among the three data collection techniques. Evaluation of the observations and in-depth interviews was done following each data collection to promote capturing specific

details of the data being analyzed manually. It was anticipated that as the data collected was not complex, manual analysis would help to sort and separate the data into themes and patterns.

Manual coding is tedious and time-consuming. It requires experience and expert skill to meticulously review all data collected. However, manual coding is cheaper and does not require elaborate and sophisticated applications to data coding and analysis. It also prevented errors and misinterpretation of data. Manual coding allowed the researcher the ability to import data from audio, video, pictures, Microsoft Excel spreadsheet documents, and portable document formats (PDF) for evaluating data. Additionally, manual coding made it easy to create folders for coded data. Manual coding enabled me to effectively analyze the data in response to each research question.

Coding is an important feature of qualitative research. Consequently, codes will be formulated from the research data, and themes and patterns subsequently identified. Additionally, by reviewing the literature, some known themes are motorcycle, rider, accident, training, regulation, environment, traffic, pedestrian, enforcement, indiscipline, measures, and helmet use which served as a code list. Based on the literature reviewed, a deductive codebook/list was developed to guide the coding process; also, code induced or identified from the raw data. The inductive and deductive codes together were integrated to guide the coding process.

Coded observation data helped data triangulation with interview data. Each qualitative research method was conducted and coded independently of the other techniques. However, after data collection and coding, the data was integrated at the point

of data analysis, and data codes from these three sources were integrated in preparation for analysis. Practically, integration of these two methods was achieved using a Microsoft Excel spreadsheet in which columns were created for each method. The spreadsheet presented an easy reference to all two data pathways. Subsequently, outcomes of the data analysis were compared to confirm and contrast with each data collection technique. It was expected that this process would establish which findings are similar and could complement each other or diverge from one another that could result in different conclusions among the two techniques (Hammarberg, Kirkman, & de Lacey, 2016).

As a qualitative research study, the outcome of the study presented in descriptive narratives with direct verbatim statements from participants to illustrate the rich detail and themes. This reporting format allowed the data and findings to focus on the participants' perspective and expression of feelings and experiences of why they, as motorcyclists, do or do not comply with regulations regarding the use of safety helmets in Tamale.

Reliability and Validity

Reliability and validity are two critical concepts in social research. Reliability of any measure is gauged by the level of consistency of the measurements produced and the confidence of achieving the same level of the outcome when the study is repeated elsewhere under the same conditions (Taherdoost, 2016). Similarly, Haradhan (2018) indicates that a study or test is valid if it successfully captures what it is designed to measure. The degree of reliability and validity of data affects the credibility and quality

of any research study; as such, deliberate actions will be taken to sufficiently ensure the reliability and validity of the study results.

Reliability

To achieve reliability of the research, Simon (2011) suggested that the researcher should triangulate different data collection tools, engage peer review of research protocols and findings, and ensure auditing of the study data. In accordance with Simon's guidance, three different data collection tools, including observation and interview was performed. Data from observation was used to triangulate data from the interview process. Aside from the dissertation committee and the IRB, the researcher allowed an expert panel to conduct a scholarly review of the research instruments and review plan prior to commencing data collection and the feedback incorporated before data was collected. Researchers have indicated that, in an attempt to achieve reliability, the tendency may be for some researchers to gloss over certain ethical issues, especially researcher bias (Fendler, 2016; Smith & Noble, 2017). To address researcher bias, the researcher declared upfront that he had no conflict of interest in the study findings whatsoever with nothing to gain or lose from the findings of the research other than to help achieve positive social change.

Validity

In qualitative research, validity is critical for the quality, rigor, and trustworthiness of the research results (Simon, 2011). Consequently, to ensure validity in this study, the researcher made every effort to achieve credibility and transferability of the study results (Mohajan, 2017). Strategies such as data saturation, member checks,

prolonged contact, peer review, and triangulation were used to attain validity (Mohajan, 2017). The strength of the external validity of this study lies in the fact that the researcher observed actual motorcyclists in the real world (Steckler & McLeroy, 2008). At the same time, the researcher interviewed real motorcyclists for their opinions, thereby enhancing the generalizability of the research (Steckler & McLeroy, 2008).

Ethical Procedures

Ethical issues are omnipresent in research and should be identified and mediated to the best extent possible. Some likely ethical dilemmas that could arise from this research relate to issues of informed consent, beneficence, and respect for anonymity and confidentiality (Fouka & Mantzorou, 2011). Of particular concern are the medium of transmitting the informed consent document and confidentiality of participants as the consent form is planned to be physically delivered by the researcher. Taking pictures or videos during the interview process could make participants apprehensive hence the need to assure them of the confidentiality of the process. The researcher emphasized the need for the pictures or video to be used just to aid the writing of the research report but nothing else.

Prior to conducting the interview, each participant's consent was sought, and when the participant gave consent, they were invited to participate in the interview and were informed about the research topic and the purpose of the study. The content of the consent form was read to the participants who agreed to be interviewed, explaining to them the study purpose and their right to participate or withdraw at any point of the study. Additionally, the participants were informed about how the data would be used

and the precautions that would be taken to maintain the privacy and security of the data. Participants were informed that the data reported in my dissertation would maintain the anonymity of responses. After receiving verbal consent from recruited participants, the researcher issued a copy of the informed consent form to the participant to complete prior to commencement of the interview. The researcher ensured confidentiality and no more than minimal risk to respondents.

Confidentiality was ensured by protecting and not disclosing the identities of the research participants. Under the dominant approach, confidentiality will be achieved at four stages of the research, "research planning," "data collection," "data cleaning," and "dissemination of research results" (Kaiser, 2009, p. 4). Numerical codes were allotted to each participant to maintain separation of their identity and collected data during the data collection, data analysis, and reporting phases to mask the identity of participants. Interview respondents were informed that the interview was to be recorded. Participants' permission and consent were sought to use audio recording devices, and they were informed how the recorded data was to be used and stored. As suggested by Flick (2014), at the end of the data analysis, the researcher conducted member checking of the transcripts by each individual participant to confirm accuracy while the anonymous transcribed report of the study was shared with the dissertation committee. Collected data was to be kept for five years and, thereafter, was to be destroyed.

Summary

This chapter has discussed the qualitative research design and the case study research strategy. This research design and methodology were sufficiently justified

through critical evaluations. Additionally, other important areas such as the study population, sampling, and sampling techniques, data collection techniques, validity, reliability, and data analysis were also discussed. In summary, this chapter concludes that the research methodology to be adopted by the researcher is sufficient to achieve the aim and objectives of the research. The data collected was cleaned, sorted, categorized, and analyzed for presentation and discussion. The next chapter analyzed the data and the findings presented for discussion.

Chapter 4: Results

Introduction

The purpose of this study was to understand why some motorcyclists in Tamale, Northern Region of Ghana, did not use helmets despite the clear physical and financial risks. My study will contribute to policymakers' enhanced understanding of factors that affect motorcyclists' decisions to not wear safety helmets. Moreover, this research may provide the National Road Safety Authority, Driver and Vehicle Licensing Authority additional context as to why motorcyclists do not comply with safety helmet regulations and enable the development of new programs and protocols to improve adherence to safety helmet use. Motorcyclists have the direct experience of choosing whether to use a safety helmet and therefore can uniquely provide insight into the factors that influence adherence.

To achieve this purpose, the following research questions guided the study:

RQ1: What are the considerations in motorcyclists' decision to wear safety helmets?

RQ2: What are the considerations in motorcyclists' decision not to wear safety helmets?

RQ3: For those who do not wear safety helmets, what considerations would make them decide to wear safety helmets?

Chapter 4 presents the research setting, participant demographics, and data collection methodology for the field observation and interviews. Subsequently, I will review the qualitative data analysis approach, including data cleaning, coding, analysis,

and themes. Moreover, I discuss how I ensured the trustworthiness and credibility of data collection and analysis. Lastly, the results of each research question will be examined and summarized.

Pilot Study

Prior to conducting research, I requested and implemented expert panel feedback on the design of the interview guide. Subsequently, I conducted trial runs of the interview questions with a pilot sample of 3 motorcyclists that while convenience methodical sampled represented the population of research participants. This brief pilot study allowed me to fine-tune the questions for the actual data collection and better understand the time needed to conduct the interview. Additionally, I conducted pilot observations on the same day of the pilot interviews at 8:30 a.m. and 2:30 p.m. on a different road than the planned study locations. This pilot observation phase provided insight into additional characteristics to include on the observation data collection tool. This practice also improved my ability to switch between observation, collecting photographic data, and recording data in the field notebook.

Settings

As part of the qualitative case study, I conducted both unobstructed observations in the Tamale Metropolis and structured face-to-face interviews with motorcyclists. This research study was conducted in multiple locations to provide representative observations of motorcyclists and, subsequently, facilitate the interview process. The four sites chosen for observation included: 1) the Vittin Central Mosque on Yendi Road; 2) the Dungu Ghana Oil Company Limited gas station on Techiman Road; 3) the Shell gas station on

Tamale-Kumbungu Road; and 4) the King David Spot on Bolgatanga Road. The observations were naturally unobtrusive, given the relative location of the discreet observation point at each location. Every tenth rider to the mosque or gas station pump or mosque was invited to participate in the face-to-face interview. If an identified motorcyclist agreed to participate in the face-to-face interview, the participant was asked to join me within an office space of the mosque or gas station as arranged with the location's proprietor. Each interview setting was private and included a small office desk with two chairs arranged for the purpose of the interview.

Participants were not exposed to any personal or organizational conditions in the research settings that would have influenced their participation, experience, or responses during the data collection. Efforts were made by the researcher to ensure observations and interviews were conducted on days law enforcement were generally not on each of the roads the study was taking place. Because motorcyclists in Tamale tend to behave themselves when law enforcement is visibly present and will not really display their true attitudes and behaviors while riding. Therefore, ensuring law enforcement was not on roads made it possible for the motorcyclists to be observed and interviewed in their natural setting. The budget for the study was funded personally by the student who conducted the data collection by himself, and there was no budget cut. Interviews were conducted within 30 minutes period and created no more stress than experienced in daily life

Demographics

The study sample consisted of motorcyclists in the city of Tamale. Participants who engaged in the face-to-face interviews provided additional demographic information than participants only observed. The majority of the respondents (54.2%) were between 37 and 47 years of age (see Table 3). Notably, more than 90% of the sample was under 50 years of age. Given that motorcycle use is traditionally male-dominated, unsurprisingly, most participants were male (79%).

Table 3

Age of Respondents

Age band	Frequency	Percent
15-25	4	16.7%
26-36	5	20.8%
37-47	13	54.2%
48-58	1	4.2%
> 59	1	4.2%
Total	24	100%

Moreover, all 24 respondents indicated they were employed and identified their occupation as displayed in Table 4. Most respondents were civil servants or teachers, but a notable number of participants were categorized as “Other,” which included marketing officer, administration assistant, office assistant, computer networking, a civilian employee of the Ghana Armed Forces, agricultural extension officer, pump attendant, petrol station manager, and principal environmental officer). Lastly, respondents provided information regarding their education experiences (see Table 5). All participants reported formal education, and the majority of respondents indicated earning a Bachelor’s degree (50%).

Table 4

Occupation of Respondents

Occupation	Frequency	Percent
Civil servant	4	16.7%
Teacher	4	16.7%
Office worker	3	12.5%
Nurse	2	8.3%
Public servant	2	8.3%
Student	2	8.3%
Other	7	29.2%
Total	24	100%

Table 5

Education of Respondents

Education	Frequency	Percent
Middle school leaving certificate	1	4.2%
Senior high school	4	16.7%
Diploma	1	4.2%
Higher national diploma	1	4.2%
Tertiary degree (bachelor's)	12	50.0%
Tertiary post diploma	2	8.3%
Tertiary masters diploma	2	8.3
Other	1	4.2%
Total	24	100%

Data Collection

The study was a qualitative case study design that used both observation and in-depth interviews to gather data to answer the research questions. Specifically, observation using a template to record the behavior and characteristics of motorcyclists as well as an interview guide for the face-to-face interviews were utilized. Interviews may be structured, semi-structured, or unstructured (Saunders, Lewis, & Thornhill, 2012); this study used a semi-structured interview. Moreover, data were collected through

observations of motorcyclists traveling through four different locations where in-depth interviews also were conducted. The observation data collection phase included counting 4,711 motorcyclists along the routes who either did or did not wear helmets and other characteristics such as minor riders and the total number of riders on a single motorbike.

Subsequently, a total of twenty-four (24) motorcyclists were convenient and methodically sampled at the same four locations and interviewed using an interview guide, which allowed almost the same questions to be administered to all the respondents. I explained the purpose of the study and requested to interview them. For those who agreed to participate, the interview commenced immediately and was completed within 30 minutes; participants who were interviewed also provided demographic data.

Data Collection Setting

The study observations and interviews were conducted in four different locations on major roads that lead from Tamale, the regional capital, to other major towns bordering it. A convenient point was chosen at all the locations to ensure a comfortable setting for the interview, free from interference and disturbance. The points chosen for the interviews were also strategic to reduce traffic noise so that the recording would be clear with little resonance and noise. The four sites chosen for observation included: 1) the Vittin Central Mosque on Yendi Road; 2) the Dungu Ghana Oil Company Limited gas station on Techiman Road; 3) the Shell gas station on Tamale-Kumbungu Road; and 4) the King David Spot on Bolgatanga Road. Importantly, the observations were unobtrusive by nature, given the relative location of the discreet observation points. Data collection proceeded according to plan as presented in Chapter 3 except that the GOIL

Filling Station on Techiman Road was unavailable on the initially planned date of Sunday, 27 December 2020, which required I move the observations and interviews to Saturday, 26 December 2020. All the managers of the four data collections sites generously declined to charge any rent from the researcher largely in part due to unanimously stating they believe the study is meant to assist the city of Tamale; additionally, given the short duration needed, they chose not to rent the sites for less than one day.

The observations were conducted on four days, including three business days and one weekend day (i.e., Monday, 12/21/2020; Wednesday, 12/23/2020; Friday, 12/25/2020; Saturday, 12/26/2020). Each of these days was dedicated to observation at a particular location of the four identified roads (i.e., Yendi, Techiman, Kumbungu, and Bolgatanga Roads). Each day's unobtrusive observation was conducted for a duration of 30 minutes in the morning and 30 minutes in the afternoon. At all locations, the thirty-minute morning session of observation started no later than 8:30 a.m. GMT. The afternoon observation session commenced no later than 5:15 p.m. GMT. These time periods were selected due to most motorcyclists are going to work and returning home from their places of work. Therefore, these time periods afforded the researcher ample opportunity to observe a maximum number of motorcyclists in their natural setting without any presence of law enforcement. After observation and photographing of motorcyclists for 30 minutes durations in the morning and afternoon to obtain the statistics of those complying or not complying with safety helmet use, some motorcyclists were invited to participate in face-to-face interviews.

Data Collection Organization

Data were mainly recorded in two different ways. There was observation where a template was used to record the behavior of motorists. This template allowed the researcher to record the details of each motorist that passed the observation point of the researcher. Essentially, any motorcyclists who passed the observation point were observed to see whether they wore or did not wear safety helmets. Other behaviors that included riding in the opposite direction of the traffic were also recorded but were not part of the template.

The second part of the data collection included face-to-face interviews. Initial contact with participants was made at the fuel pump or mosque yard when they stopped to buy gas or came to the mosque. I implemented convenient and methodical sampling and invited every tenth rider to take part in the interview. This was to allow the researcher time in between interviews in the data collection process to organize observation and interview notes collected. When a motorcyclist was identified to participate in the interview, I described the research study and requested their participation. When identified potential participants agreed to engage in the study, they were given the informed consent form, which was read by the researcher to the participants explaining the participants' rights and benefits. Subsequently, the participant was immediately escorted to an office at the gas station or mosque office space. The interview setting had a small office desk and two chairs arranged for the purpose of the interview.

Once seated, I informed and received permission from the participant that the interview would be recorded in audio format for later transcription. Additionally, notes of the interview were recorded in a field notebook. To acclimate and relax the participant for the interview, rapport was established by engaging in a brief introductory conversation. An interview guide used in the data collection is attached in Appendix B. Each question on the guide was posed to the participant, and follow-up questions were made where clarifications were needed. The one-on-one setting was to create a sense of privacy to encourage respondents to provide honest answers. The interviews were conducted in the English language. All the participants were literate and comfortable with the English language. Each interview was completed within 30 minutes. At the end of the interview, the researcher thanked the participants.

Data Analysis

Observation Themes

Data collection details and characteristics from the observations at the four different locations are summarized in Table 6. It should be noted that all four locations exhibited clear weather for observation. The majority of motorcyclists during the observation periods were men. Further, the majority of motorcyclists across the time periods and locations did not wear safety helmets. Moreover, across the four locations, it was further observed that the most vulnerable groups, like children and the elderly, normally rode without safety helmets. The elderly, approximately 60 years or older, typically rode with traditional hats instead of helmets.

Table 6

Observation Data at Different Locations

Location	Date	Observation period	N	Male driver	Helmet worn
Tamale – Yendi Road	12/21/20	7:57 a.m.- 8:22 a.m.	643	589 (91.6%)	53 (8.2%)
		4:30 p.m.- 5:00 p.m.	619	538 (86.9%)	161 (26.0%)
Tamale – Bolgatanga Road	12/23/20	7:57 a.m.- 8:22 a.m.	637	585 (91.8%)	93 (14.6%)
		4:30 p.m.- 5:00 p.m.	738	657 (89.0%)	108 (14.6%)
Tamale – Kumbungu Road	12/25/20	8:30 a.m.- 9:00 a.m.	700	595 (85.0%)	112 (16.0%)
		5:06 p.m.- 5:36 p.m.	432	391 (90.5%)	32 (7.4%)
Tamale – Techiman Road	12/26/20	8:00 a.m.- 8:30 a.m.	442	410 (94.9%)	51 (11.5%)
		4:47 p.m.- 5:17 p.m.	500	444 (89.0%)	36 (7.0%)

Interview Data Coding Process

The interview recordings were transcribed into Microsoft Word documents using an online transcription software called Otter (https://otter.ai). The subsequent automated transcriptions were reviewed for manual corrections needed and were also complemented with the handwritten interview notes recorded in the field notebook. I reviewed the transcripts several times, which allowed me to begin identifying common themes and coding the data accordingly. After the data were fully coded and categorized, eight common themes were evident. According to Creswell (2003), to analyze qualitative data, the researcher must put the data into categories and label those categories with themes. Linneberg and Korsgaard (2019) posit that this process helps to group similar events under a related heading or classification to allow the contents to be verified systematically. Care was taken not to disregard new categories that may be specific to Ghanaian motorcyclists. Category verification was conducted to review and avoid issues of biases.

The concept of template analysis by Brooks, Bartys, Turley, and King (2015) was employed to produce a list of codes or templates that represent the themes identified in the data. This technique allowed for more flexibility for the researcher to tailor the codes to match the requirements of the study. After the interview process was completed, the data analysis phase began in which I carefully organized, coded, and categorized the observations and in-depth interview data into themes and patterns.

The template analysis (Brooks, Bartys, Turley, & King, 2015; King & Brooks, 2017; Nowell, Norris, White, & Moules, 2017), a thematic analysis method of organizing and analyzing qualitative data in social science research, was implemented. The development of a coding template allows the researcher to summarize themes identified as important in a dataset and then organize the themes in a meaningful and useful manner. The themes are the recurrent features of participants' accounts about particular perceptions and/or experiences that the researcher sees as relevant to the research question. The template analysis coding flexibly allowed the identification of themes in the accounts of data collected, and labels (codes) were subsequently attached to index them. Once completed, the researcher organized the themes and codes into a template that is organized to meaningfully represent the relationships that exist between different themes and patterns. This provided an initial template.

Instead of using either deductive codes or inductive codes for the data analysis, I chose to use both deductive and inductive coding techniques to achieve the advantages of each and mitigate each approach's shortcomings. Consequently, the inductive and deductive codes add rigor and trustworthiness to the findings (Nowell, Norris, White, &

Moules, 2017) that emerge and ensure an unbiased and holistic review of themes (Medelyan, 2020). The coding process was improved by reviewing the literature for known themes such as motorcycle, rider, accident, training, regulation, environment, traffic, pedestrian, enforcement, indiscipline, measures, and helmet use that served as a priority theme list. The researcher developed deductive codes from the literature review for this study, including motorcycle, affordability, convenience, cost of the motorcycle, accidents, pedestrians, road users, and regulation environment, among others. These codes were put together as a codebook to later guide the data coding and analysis process.

After data collection, the researcher allowed codes to emerge from the data analysis inductively. The inductive process involved dividing the data into four sets of interview transcripts. Thereafter, the researcher read one-quarter of the data as a sample (i.e., six respondents) to get a sense of the overall data. Subsequently, the researcher identified and applied codes based on the sample. Next, the researcher read through a new set of sample data and applied the codes that were created for the first sample. During this process, the researcher noted codes that did not match and added new codes based on the second sample. This process was repeated for the four data sets based on the sample size of 24 respondents. Themes that were unmatched were deleted. All codes were recorded and organized in an excel sheet as a codebook. The whole inductive coding process was iterative and confirmed several of the codes identified in the deductive codebook. Combining both inductive and deductive codes in the data analysis provided the researcher a wider scope of themes and categories, which also improved the

accuracy and strength of the analysis. However, the inductive coding produced more codes than expected using the template analysis.

The process of template analysis of the data occurred after the audio interview was transcribed and corrected. The steps performed in the template analysis were based on the outline by Brooks, Bartys, Turley, and King (2015); these steps include becoming familiarized with the data, conducting preliminary coding, grouping emergent themes into identifiable clusters, developing a premier coding template, applying the premier template to other data and revising as required, and completing the template for application to all data collected.

The researcher first reviewed the data to become more familiarized with what the data contained before starting any coding; this was also to avoid performing only linguistic analysis of the data. The researcher selected and read through the first quarter of data (i.e., 6 of the 24 interviews) for familiarization purposes. The researcher then did a preliminary coding on a subset of four randomly selected interviews by highlighting issues of interest to the study objectives while reviewing the data. Indeed, some a priori codes and themes in the literature were identified and written in the margins of the data document as the reading progressed.

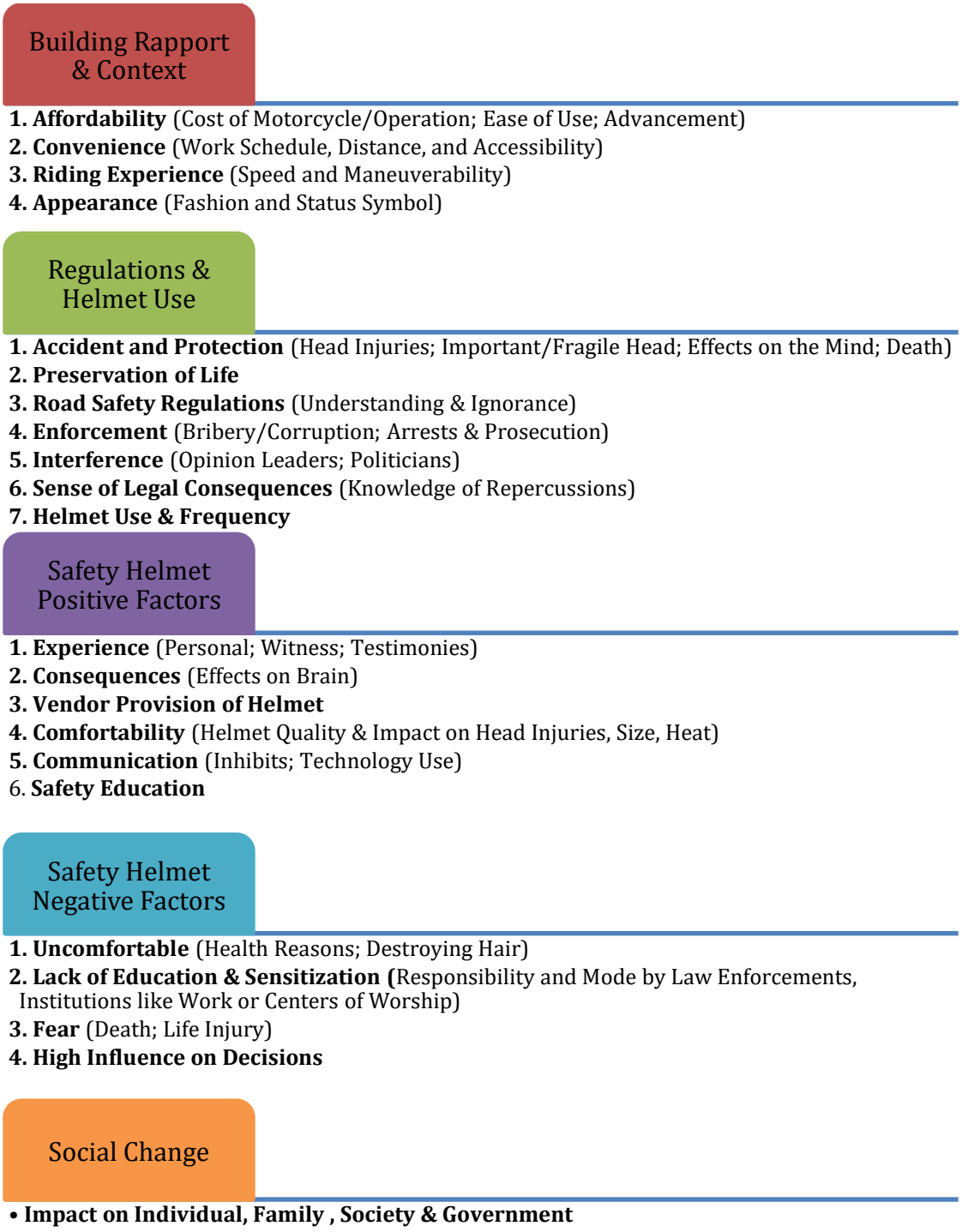
Subsequently, the researcher developed an initial template using the themes and codes identified in the data and also the a priori themes. The template was organized to reflect the relationships between different themes or codes and was applied to the remaining interview transcripts; as suggested by previous researchers, the template was modified as necessary in situations where the themes on the template did not “fit” the

data (Brooks, Bartys, Turley, & King, 2015, p. 204). Based on guidance (Brooks, Bartys, Turley, & King, 2015; King & Brooks, 2017), the researcher worked through several transcripts noting possible revisions, and then modified the template in an iterative process producing successive versions of the template. The final version of the template is presented in Figure 7 and demonstrates the concepts that aid a rich and comprehensive interpretation and analysis.

Initially, the data was read through casually to get familiar with the data collected. As one read through the data, some keywords and phrases were highlighted in different colors. Thereafter, the research took a sample of the data set and conducted an initial coding. The premier coding was to enable a formulation of a code template. This preliminary coding yielded some codes which were used for the initial template. The emergent codes were grouped into themes and definable clusters. This was to enable meaning out of the themes and clusters. From defined clusters, initial coding was formulated and applied to further subsets of the data. The template coding was all done repeatedly to yield more codes and themes. The more codes that emerged required refining the template to include the new additions and remove codes that did not match with the initial template, and the whole process appeared cyclical and iterative. The final template that was created was applied to the rest of the data (24 interviews) collected. This template was organized to usefully and meaningfully represent the relationship between different themes or codes, as displayed in Figure 7.

Figure 7

Template Analysis



As a qualitative research study, the outcome of the study will be presented in descriptive narratives with direct verbatim statements from participants to illustrate the rich detail and themes. Hence, the focus is on the participants' perspective and expression of feelings and experiences of why they, as motorcyclists, do or do not comply with regulations regarding the use of safety helmets in Tamale. In this study, a thematic presentation of the findings, with a small number of case studies to illustrate key themes, was followed. The themes presented above were used as a guide to give an in-depth discussion.

Affordability

Motorcycles provide a major means of daily transportation for people globally; their popularity is due mainly to affordability. The cost theme addresses both the motorcycle as well as the safety helmet. While almost all 24 respondents indicated that the cost-effective nature of the motorcycle determined its use as their main means of transportation, some 15% of the 24 respondents indicated they did not always use the safety helmet due to its cost. Motorcycles are truly less costly in most developing countries, such as Ghana, where motorcycles mostly augment the traditional means of transportation for private and commercial purposes. Typically, motorcycle use is most prominent in rural and peri-urban areas of Ghana, where income levels are low and road infrastructure is either non-existent or very poor. The expression of the concept of cost-effectiveness of the motorcycle and safety helmet came in several different aspects; however, attributing the cost of safety helmets to its non-utilization is counterintuitive as

the cost of the safety helmet is relatively inexpensive compared to the cost of the motorcycle.

Some of the participants expressed the costs of the motorcycle and safety helmet in terms of acquiring them. Tamale, the study setting, is the administrative capital of the Northern Region of Ghana, West Africa, where main economic activities include farming, hunting, cloth weaving, and trading. The northern parts of Ghana are mainly rural and peri-urban, where the primary occupations of the people are farming and trading. Therefore, earnings are generally low, which factor into the considerations for cost of purchasing vehicles or means of transportations. For instance, a participant put it this way, "I would have wish to own a car but because of financial constraints I have settled for a motorcycle. I don't have the capacity to buy a vehicle. What I have can only afford the motorcycle." Like many of the residents in the northern parts of the country, cost of purchase was a major consideration. Another participant similarly expressed, "Because I don't have the resources to buy a car and the cost is lesser than buying a car. You can also use it even if you don't have money because with 5 Ghana Cedis, you can buy fuel and go to anywhere you want to go to." To avoid borrowing loans from the banks with exorbitant interest rates a participant stated, "Because it is the only ways and means that I can afford with my own money." Surprisingly, another respondent intimated that "I don't use safety helmet because I can't afford one".

Another cost element of owning a motorcycle has to do with that of operation and maintenance. As compared with other means of transportation like cars, there are minimal costs associated with fueling and maintaining motorcycles. Most of the

respondents were of the opinion that this low cost of operating the motorcycle motivated them to prefer it over other modes of transportation. A respondent concisely captured this sentiment saying, “The reason I use a motorcycle is because it is economical.” Another said, “Motorcycles are easy to service and maintain. Maintain as in keeping the shape of the machine in terms of cost.” Considering the recent continuous rise in the price of fuel and vehicle parts in the country, it is unsurprising to see an increase in the number of motorcycles and low-consumption cars in the cities. Reflecting on the cost of operating a motorcycle, a respondent said, “As I said, the motorcycle is what I can afford now and looking at my movements, it is very convenient to me. I use for work and other places I have to go.”

Another cost element expressed by respondents were the ancillary costs associated with owning a motorcycle, such as a helmet and training. Specifically, one respondent mentioned, “I don’t use safety helmet because I can’t afford to buy it. I don’t have money. My Company gave me the motorcycle without the safety helmet”. Moreover, another participant responded, “I don’t use safety helmet because it is not convenient. When you wear it you are sweating and having heat on your head. Also, if I go out with helmet where to keep it safe without it being stolen is a worry. So, it is inconvenient to me”. One participant spoke of the learning curve in the use of the motorcycle is short, “The reason why I like using motor bike is something that is simple for me to use and the fuel, consuming of the fuel you compare with car.” Considering that motor vehicle driving school education can take between three to six months, a relatively shorter duration is required to learn to ride a motorcycle. Moreover, the cost for driving

school can be very high compared to the relatively inexpensive cost to learn to ride a motorcycle. One respondent expressed this sentiment as, “Motorcycles, riding a motorcycle is more convenient, it’s less expensive means of transport. Personally, and speaking to a lot of people, motorcycle is easy to use and is less expensive that's what I can say.” Further, a different participant said, “Riding a motorcycle is very convenient. In terms of buying fuel, if you own a car and a motorbike you will realize that using the motorbike is very cheap. And the motorcycle can take you far to where you want to go to.”

Notably, one respondent expressed the view that owning a motorcycle was an advancement over other traditional means of transportation such as the bicycle, donkey, or walking. When asked why he would prefer using a motorcycle to other means of transportation, he replied,

> Comparatively, motorcycles are faster. Yeah basically they are faster and so I will prefer using a motorcycle; to consider in the nature of our jobs and the way the world is moving today. Technology in itself has moved us to that level and so I prefer motorcycles to either donkeys or other means of transport.

Traditionally, animal-aided transportation was the main means of movement. Then came the bicycle and the motorcycle. Hence, respondents expressed that the motorcycle is now the traditional means of transportation in the northern part of Ghana. A respondent stated plainly, “And more to the point, it is the main means we have in the Northern Region here. Besides I don’t have money to buy a car or any means so I decided to buy a motorcycle.” This same sentiment was expressed by another participant as, “In our

jurisdiction, I think that is the most affordable means of transport. So almost every household has a motorcycle."

Convenience

Transportation should offer ease of movement to enable people to carry out their economic and other activities. Hence, in deciding what mode of traveling would suit various situations, the question of convenience came up in the interview responses. Almost all respondents thought that the motorcycle offered more convenience than other modes of transportation when it comes to traveling in the Tamale Municipality. This issue of convenience was also reinforced by several considerations, including the work schedules of the people involved, distances they must travel, and accessibility to the areas they wish to travel to. However, in consideration of using safety helmets, most motorcyclists interviewed indicated it was inconvenient to wear them. One motorcyclist, in particular, said, "I feel inconvenient when I wear it. When I get to my destination where to keep the safety helmet so that it will not be stolen is always a bother to me. Because of this I don't wear the safety helmet many a time".

Further, the work schedules of people also influence their decisions to choose motorcycles as their means of transportation over others. It came out in the interviews that some of the respondents would prefer using motorcycles even if they could afford to buy other higher forms of transportation such as cars. The northern region, characterized as a farming community, has a lot of agricultural officers (especially extension officers) who access very remote areas during the rainy season when the roads are undrivable. In addition, ordinary people engage in farming and trading activities in remote areas that

require the high maneuverability of the motorcycle. This situation is expressed by a respondent as follows:

> Because of easy accessibility to areas I work. Considering my work schedule, I can easily access my catchment area faster than even if I was to be driving a car. I am a field officer and some of our areas are such that there are no accessible roads to the communities a car can use other than a motorcycle.

This reason was expressed by a substantial number of the respondents. Another respondent, not in relation to farming specifically, still claims that his work requires a vehicle such as a motorcycle to make his work commute easier. He says, “I have chosen to ride a motorcycle because of my work. Normally, I go to the post office to pick letters (mails). Also, I go to Ghana News Flash to pick Daily Graphic (e.g., newspapers). And that is the reason I use motorcycle.” In a similar situation, there are those whose residence is remote and far from the nearest place where they can get transportation to work hence, the motorcycle is the most convenient means of transport for them. A respondent claim, “My place is very far from the roadside. So, I have to use the motorbike because I can't get off. I have to walk a long distance to the main road before I can get a means of transport.”

Motorcycles are faster in our modern cities and towns where traffic is becoming more prevalent. The theme of maneuverability and speed of traveling on the congested roads and streets run through almost all the participants’ responses. One of the main goals of transportation is speed and quick arrival to where one is traveling. Since the motorcycle is able to better maneuver through roads and streets that other vehicles cannot

pass through, they will be faster than other larger vehicles. Like several other respondents, one mentioned, “Actually, motorcycle is mobile in terms of going to work. It is easier to reach where you want to reach especially when there is traffic. And is also a beginner, when you are starting life, you start with those level till when you are okay then you can move to another stage.” Another respondent described this feature of the motorcycle as, “And they are some areas in our area here particularly in our geographical area where vehicles cannot access but with motorbikes you can easily access those areas.” Further elucidating this point, another participant comprehensively described the maneuverability of the motorcycle as:

> In terms of traffic when you are in the traffic you know it's not like a vehicle you can find your way through the vehicles to where the traffic light is as I told you it's not like a vehicle. Secondly, its fast in terms of I mean, like potholes, and then yes potholes. You can mingle your way where you can see a small path where you can pass like a vehicle cannot pass.

Appearances

Another surprising theme that permeated the interview scripts was seeing the motorcycle as an object of fashion or status. This revelation was rather surprising because there are now many very affluent people in Tamale and other parts of the northern regions of Ghana. However, the motorcycle is now genuinely preferred over cars. Although one participant didn’t personally agree with this view, he believed people see the motorcycle as a status symbol or fashionable; he remarked:

> And so one other thing that I have considered, I've seen not personally but I've seen is largely something that most people look at as fashionable because when you have a motor cycle people see you they recognize you, commonly people say that when you befriend a lady, even if you choose to buy a car for the lady they say no so she wants a motorcycle so motorcycle has a certain level of um I don't know how to say but people prefer … people see it as a prestige to own a motorcycle.

Accidents and Protection

The increased use of motorcycles by the population leads to an increase in the rate of accidents among the users, which can ultimately lead to an increase in road fatalities and serious injuries. Road fatalities and injuries occur when motorcyclists disregard safety issues, including speeding, driving while fatigued, driving with distraction, driving under the influence of substance use, and a host of other factors. A particular factor regarding motorcycle accidents that may result in fatalities and serious injuries, especially to the head, is the use of a safety helmet for protection.

Hence, these two themes of accidents and protection recurred throughout the interview scripts. Respondents acknowledged that they do have accidents sometimes and that when accidents occur, they can lead to serious injury or fatalities. When questioned about safety helmets, all motorcyclists stated that it was a gadget worn to protect the head in the event of accidents. All of them, without exception, identified and correctly described the helmet as such. For example, in the words of one respondent, “A safety helmet is a safety equipment to protect the head in times of accident and protect the head

from being crashed." Another respondent described it as a "Motorcycle helmet is something that protects the rider in times of accidents where he will not get injuries relating to the head. It is therefore a protective device that protect the head of a rider." Moreover, another respondent said, "It is something that is used to protect the head in, in in the event of an accident."

Even those who agreed that they do not use these helmets demonstrated knowledge of what the helmet is and its purpose. One respondent said, "I know. It is something riders use to cover their head when riding a motorcycle." It was observed that motorcyclists that do not use the helmet tended to describe it in more detached terms. For instance, one respondent described it in this way, "The safety helmet is what we used supposedly when riding the motorcycle and is supposed to protect the upper part of the body specifically the head in case of accident." This demonstrates that all riders whether they use the helmet or not have a good idea what the helmet is.

The safety helmet helps reduce head injuries and fatalities in the event of accidents while riding the motorcycle. This fact is known to all interviewed motorcyclists, and they unanimously expressed this knowledge in clear terms. Some indicated that the helmet is to protect the head, which houses vital organs which are important but fragile such as saying, "It is meant to protect us from injury to the head in case of accident. The head is where the brain is house and once the brain is damage, one cannot think well." Others also intimated that being involved in accidents when not wearing safety helmets can lead to irreparable effects on the brain. This respondent gave a rather elaborate description of this effect:

> If you get accident and you get injuries to your head, even if you don't die you can never make it in life. You will be miserable, and you cannot control anything. The brain will be damage, and everything will be so disorganized, and you can't think proper. You can't take part in any meeting in a group that is to take decision and you can't take decision for anybody. So that is part of the reason why I always wish to put on the helmet even if you will get fracture is better than to get head injury.

Finally, others contended that riding a motorcycle without a helmet could lead to death as the ultimate consequence:

> It is meant to achieve prevention of premature death. I call it premature death because when you know if I wear it will save you and you neglect to wear and get involved in motorcycle accident and die it means your death is premature. When you look at those of us who are riding, I can say about 80 percent are the youth. The elderly prefers riding their bicycles. And when an elderly person is riding a motorcycle there are more careful than the youth. And so actually wearing the helmet protect your head from getting crashed when you have an accident.

Road Safety Regulations

Participants were asked about their awareness of road safety regulations and how these might impact their helmet usage. Respondents displayed varying levels of knowledge regarding road safety regulations in Ghana; overall, the responses showed deficits in the level of understanding of the provision of these laws in Ghana. Some of the respondents were transparent in their responses and honestly said they had no knowledge

of these regulations; for example, one participant said, “To be sincere with you I know little about the road traffic regulation on helmet use. I only know that one is supposed to wear helmet when riding. Aside that I don’t know anything about the regulation.” Another simply said, “I do not have an idea about it.” Similarly, another also said, “I don’t know much about it actually.”

Conversely, there were several who had some knowledge about the regulations. For example, some said, “Yes, I know something about the law. If you don’t wear helmet and you are caught you are liable to a fine or imprisonment.” Moreover, another participant said, “Actually, I know that riding a motorcycle in Ghana without safety helmet is illegal or it is against the law of Ghana.” And similarly, one said, “Yes, I know. The law says every motorcycle rider must wear a helmet. If you do not wear the safety helmet and you are riding the MTTD [Motor Transport Traffic Department] have the right to arrest you and process, you for court.”

Even these answers are given by most of the riders that showed they know that it is illegal to not wear a helmet demonstrate they did not know the exact provisions and consequences when the law is breached. One respondent said, “Well, much is not known about that but for my understanding of the regulation, it is a criminal offense for one to be seen riding the motorcycle without the helmet.” He then continues to say that:

> Actually, I don’t know about the penalties for an offender who flouts the regulation on use of safety helmet. Sometimes, we meet the MTTD at the traffic light and if a rider does not have a safety helmet, they are made to pay 50 Cedis and this does not come with a receipt. And they will not even give you the helmet.

Sometimes that is the punishment one receives for riding a motorcycle without a safety helmet.

This brings up another issue that kept appearing in most of the interview script, the theme of bribery and corruption with the law enforcement agents. Respondents repeatedly brought up this issue of how they pay money, have seen people pay money, or at least have heard of people paying money to the police to be freed when they are arrested for not wearing helmets. One respondent in particular claim that the law enforcement agents take money from riders to be released, "As usual is something that we do, either you beg or they fine you to pay an amount before they release the motorbike to you and afterwards, the police will advise you." Another respondent put it this way, "When arrested for not wearing a safety helmet is to give a policeman one or two Cedis and you will be released to go. So, because of that I prefer paying one Cedi and to move freely than wear helmet and get baldhead." Yet still, another confirmed by saying that, "Well that is what some people do. They will just arrest someone for the offense of not wearing helmet but in the next 30 minutes you will see the same person riding the same bike and still without a helmet."

The corruption is also evident in other occurrences; for example, opinion leaders of the community and politicians interfere with the operations of the law system. It is a common practice not only in Tamale but in Ghana as a whole for people to call either an opinion leader (i.e., a high-ranking person or a politician) to intervene or to interfere and interrupt the application of the law for not wearing a helmet. One motorcyclist revealed that "offenders are arrested but when they are arrested, opinion leaders go in to intervene,

so they don't really feel the law the penalty of what they have committed." He continued to explain that these leaders act this way and interfere with the law because "Most of these opinion leaders are also illiterates." It is not always that the law enforcement engages in acts of corruption, but they may be powerless when orders come from "above" to release an offender. This is explained by a respondent this way:

> And sometimes when the MTTD wants to press charges against offenders, politicians and opinion leaders will intervene to get the offenders released. So, these kinds of interventions and interference in the work of the MTTD make some of our motorcycle riders in Tamale think not wearing safety helmets is normal.

Factors Promoting Use of Helmets

Out of the 24 respondents interviewed, 8 admitted that they wore helmets always or anytime they rode their bikes. The rest of the respondents were not conclusive on their use of helmets, but most said they were irregular users of helmets. Among the factors that will encourage riders to use helmets, respondents mentioned that their own personal experience and involvement in accidents inform their decisions to wear them. A respondent recounts his experience, "For me, my decision to wear helmet always has been influenced by my personal experience. Because if I was not wearing safety helmet and had that accident I could have died."

Others did not have personal experiences but witnessed accidents involving people who were not wearing a helmet. This had a dramatic effect on them and therefore gave them a reason to wear a helmet when riding. This person narrated his witnessed experience as, "Because I never witnessed an accident without the rider using a helmet

until I witnessed a rider without using a helmet accident." Another respondent recalls how his brother was saved by a helmet:

> My elder brother had an accident with a motorbike and a helmet saved his life. He was wearing a very good helmet and it saved him his life. By then I was not riding bikes. I wasn't riding so much so that was where I got the experience and he wore the helmet had an accident and it scratched him on the floor for a very long distance before it's touched his jaw, so it taught me a lesson that's as for helmet, helmet is key before I ride a motorbike.

Another group of respondents now wear helmets, not due to personal experiences or having witnessed any accidents first-hand of riders not wearing helmets, but they had testimonies of people who had either had personal experiences or witnessed first-hand accidents. A respondent tells of how medics who are involved in the treatment of accident victims described the gory nature of motorcycle riders involved in accidents when they were not wearing helmets. One said, "Yes, I have friends who are medics, and they've told me the repercussions of helmets."

Comfortability

Wearing a helmet raises the issue of discomfort to the rider. However, the quality of the helmet can be helpful. A good quality helmet not only provides a more effective reduction of an accident's impact on the head but also is much more comfortable due to the factors of helmet size are taken into consideration in the helmet selection. Thus, ill-fitting helmets will produce greater discomfort than properly fitting ones. A respondent explained thus, "In terms of safety, my safety helmet is the crash one and I will say it's

100 percent. Because I have actually landed on the ground and had not crack on it." Another explained the issue of size and fitness "know what it's of sizes so when you get your size you will be comfortable with it because if you don't get your actual size that's where you will be having the discomfort."

Some of the motorists complain of excessive heat while wearing helmets. One respondent commented that "Sometimes the heat is unbearable." Another one added, "Some friends say that when they wear helmet their forehead is always sweating. So, they don't wear it because of the heat," and laments that, "If I wear safety helmet I don't hear and also I feel heat too." Conversely, some respondents have reported that their helmets do not produce heat since it is the enclosed type stating, "The type of helmet I have is an enclosed one. It has a shield and very comfortable and there is not heat in it. It is heavy and uncomfortable. This is the reason I normally don't wear it in town on very short journeys." Although this motorist does not feel the heat in his helmet, he does complain that it is too heavy, which is a reason that makes him not regularly use the helmet. Further, he also mentions that his decision to use the helmet is premised on the distance he is traveling; on short distances, he does not wear the helmet.

Some respondents cited difficulty in communication, such as hearing the noise from their surroundings. One respondent said, "I wanted to buy the helmet initially and a friend told me that when you wear the helmet, and a car is coming from your rear you don't hear. So, I didn't buy it." Further, he goes on to explain that "Because I feel heat in it and when you call, I will not hear anything." The respondents not only expressed complaints about not being able to hear but also explained that they are unable to see

properly in the helmet. “How comfortable is … you can easily hear or see very well even when you wear the helmet you don’t feel like something is covering your head Something like that should have been designed.” The issue of communication can be problematic. Respondents claim that it is to the extent that they can hardly hear cars behind them even when they sound their horns, and so this may lead to accidents. One respondent explains it this way, “Wearing helmet sometimes when you are riding someone talks to you, you don’t hear, sometimes when a motor bike or a car is at the back and it is trying to overtake even with the horn sometimes you can’t hear as you.”

Education and Sensitization

Among the factors that promote helmet use are education and sensitization on the topic of safety. Education will help people balance their desire to be free while riding motorcycles with the dangers associated with not wearing helmets. Several notable reasons for people not wearing a helmet were shared, including:

> wear, they don’t feel comfortable in it; also, with the ladies they say their hairstyle at a point its disorganized when they wear the helmet; then again, here in Tamale the standard is that when you wear a helmet it means you are not a perfect rider, so they don’t wear helmet for this reason.

Hence, respondents believe that there is not enough education on the use and benefits of deciding to use a helmet compared to the dangers when deciding not to use a helmet. To this issue, a relevant question is whose responsibility it is to get the education and sensitizations done. Many respondents stated that there should be institutional collaboration on educating motorcyclists in riding safety by law enforcement agents,

which can go a long way in helping improve the rate of helmet use. Also, various institutions (e.g., banks, churches, mosques) should make it compulsory for riders to wear and carry safety helmets before they can transact business or enter the location. This very detailed explanation was offered by a respondent:

> I think education, continues education. Education is just a key. That's, that's what I can say. Because I don't think it's something that we should be given awards for that because it's for the rider's personal safety and so I think that's the education in all forms in the churches and the mosque, everywhere. Where I worship for instance, it's there, it's at the gate: no helmet no entry. So, you realize that people are making sure that when they are coming there, they must wear the helmets, this time the banks, if you do not have helmets, you can't enter the banks. So consciously, gradually every institution should ensure that no helmet, no entry, so you can't come and park your motorbike outside of the premises, you must bring your motorbike for the safety of the bike. And so that's one thing that I think we should do, and the law enforcement agencies should be empowered. In Tamale, for instance, I realized that there is difficult to control that police are finding difficult to do so for what reason I don't really know I don't know if it's political influence so I think that these are things that you should be able to make sure [of]

Importantly, it should be noted that giving people direction without context and meaning may not yield the desired results. This respondent believes that where there is appropriate education, it can influence the attitude of motorcyclists to start using helmets. He described this as:

> I think public sensitization. I feel sometimes people don't use safety helmets for lack of education. Just telling people to wear safety helmets without explaining the reason why they should do that, I think, is a problem. When motorcyclists are sensitized just like this interview we are having, at the end of the day it will encourage me more to wear the helmet.

Another respondent advocated for other means of sensitizing people on the use of helmets:

> As I said, there is the need for adverts in the media to educate people to wear safety helmets and the effects of wearing safety helmets. And also, the police should be on the streets to advice motorcyclists who do not wear helmets. Or they can even print stickers and give out freely for riders as part of the safety helmet use education. Also, parents can advise or wives and children on the use of helmets that will go a long way to prevent a lot of us involve in motorcycle accidents. By using helmets, it will reduce the number of deaths and injuries we record at the hospital through motorcycle accidents.

Some respondents confided that the fear of injury and even death greatly influence their decision to wear helmets. A respondent argued that:

> It takes a discipline rider to remember about the dangers involved in not wearing a safety helmet. So, it is an attitudinal issue. Also, authorities such as MTTD and DVLA operations in town can influence the wearing of safety helmets. Arresting motorcycle riders without helmets make them try to dodge or pass through where such law enforcement people are stationed.

Another respondent observed that when he is ordered to use his helmet, with the order coming from his work boss, the compliance rate is high, “If my boss sends me he always insists that I wear helmet. Also, my work influences me to wear helmet.”

Social Impact

The social impact of the cost of motorcycle accidents on society was generally agreed by participants to be enormous. The impact is seen on the individual who loses his life. The respondents pointed out that it is mainly the youth who are more reckless on the road; hence, any impact at the personal level is felt greatly. On the family level, the motorists are normally the breadwinners of the family. Hence, any injury or death will mean not only a loss of a loved one but a loss of family income that is going to have dire consequences on the surviving family members. Further, the society at large suffers and pays for needless costs. A respondent said that an increase in the use of helmets “would increase productivity, and then again, the government will also not have to spend much on these casualties in the hospitals. And then these people will also, most of them are breadwinners for the family so when they are gone there will be nobody to take care of the family.”

Evidence of Trustworthiness

Establishing trustworthiness involves several concepts such as credibility, transferability, dependability, and confirmability (Morse, 2015). In this study, efforts were made to achieve reliability and validity, which support achieving trustworthiness. Hence, trustworthiness was achieved by the use of triangulation through different data collection tools, engaging peer review of research protocols and findings, and ensuring

the audit of the study data. In this study, ensuring credibility, transferability, dependability, and confirmability was achieved through two different data collection tools, including observation and interview. Additionally, an expert panel was also engaged in a scholarly review of the research instruments and reviewed the study plan prior to commencing data collection.

Validity

Validity is critical for the quality, rigor, and trustworthiness of the research results. The researcher achieved credibility and transferability of the study results through strategies that included data saturation, member checks, prolonged contact, and peer review, and triangulation. For external validity, the researcher observed and interviewed actual motorcyclists in the real world for their opinions during the period of observation as well thereby enhancing the generalizability of the research. By comparing the qualitative data collection methods, the researcher expects to improve validity, rigor, transferability, and acceptable outcomes, which can be generalized and applied in any part of the world.

The observations of motorcyclists were conducted in four different locations in Tamale (Vittin Central Mosque on the Tamale –Yendi Road, King David Spot on Tamale – Bolgatanga Road, Shell Filling Station on the Tamale – Kumbungu Road, and GOIL Filling Station Dungu on the Tamale – Techiman Road). One of the main instruments used to document the observation was through photographs of riders wearing or not wearing safety helmets. Also, motorcyclists were invited to participate in a face-to-face

interview at the location of the observation. The researcher collected data with the aid of an observation checklist, camera, voice recorder, and a notebook.

Results

This section presents the results of the study, which had the overall purpose of using qualitative case study research methods to explore the reasons some motorcyclists do not comply with the government regulations requiring safety helmet use in Tamale. The study used a qualitative case study with unobstructed observations and in-depth face-to-face interviews with motorcyclists conducted in four locations on main roads leading in and out of the Tamale Metropolis to elicit their opinions related to the research questions. Finally, the analysis was done using template analysis, a thematic analysis method.

The results of the study are organized to address each of the three research questions to help achieve the study purpose. These research questions are:

RQ1: What are the considerations in motorcyclists' decision to wear safety helmets?

RQ2: What are the considerations in motorcyclists' decision not to wear safety helmets?

RQ3: For those who do not wear safety helmets, what considerations would make them decide to wear safety helmets?

Each of these research questions will now be addressed using relevant data to support them through quotes from the interview transcripts or portions from the observations.

Summarizing Research Question 1

RQ1: What are the considerations in motorcyclists' decision to wear safety helmets?

One of the primary research questions was to understand what factors influence motorcyclists' decision to wear safety helmets. Certain factors should exist that prompt riders to wear safety helmets; these are the factors or considerations that this study is interested in finding out. Through data collection, some factors have emerged explaining considerations made by motorcyclists in the Tamale Metropolis of the Northern region to wear helmets and are discussed below.

A major theme that was obvious in consideration of motorcyclists' decision to wear safety helmets was protection. Respondents who claim they have always worn helmets stated almost unanimously that the first consideration that motivates them to wear the helmet before engaging in a ride comes from protection. The respondents revealed that they wear the helmet to ensure that they are protected in the event of accidents. They indicated they wear the safety helmet to protect them from head injuries if an accident should occur. This consideration, according to the respondents, is informed largely by witnessing accidents where the victims who were not wearing helmets experienced injuries to their heads. Respondents explained that accident victims who were not wearing helmets had serious injuries to their heads, requiring surgery in some cases. Where the accident victims survived the accidents physically, it affected the victims mentally and emotionally due to the impact on the head. A respondent gave this account:

> I witnessed some motorcycle accidents involving other persons not myself. The motorcyclists did not have safety helmet and their injuries were so severe that they had to be operated on in theatre but even that some got mad and are not normal. Also, I have another guy in my office. He does not normally wear safety helmet and one day he had an accident and ever since he has not been normal. When he speaks, he is incoherent, and you cannot make meaning of what he wants to say.

Similarly, another respondent reported that:

> I wear the helmet to avoid getting injured with my head because it's a bad thought when you get an accident, you know that if it affects your head if not death then you might be maimed for life and might destroy your life for forever and so let me use that word.

Clearly, these two statements indicate that fear more so than protection is evident in responses. The fear of injury motivates motorcyclists to want to protect themselves from head injuries. Still, in line with the protection theme, some respondents shared that they wanted to protect themselves from death if they were involved in an accident, hence, their decision to wear helmets. A respondent suggested dying from a motorcycle accident should be considered a premature death; the respondent claims that protection or "prevention of premature death" motivates him to wear the helmet. Another respondent wears the helmet because he had experienced an accident and was saved from severe injuries and death due to the helmet he was wearing. He narrates his experience as, "For

me, my decision to wear helmet always has been influenced by my personal experience. Because if I was not wearing safety helmet and had that accident I could have died."

Hence, motorcyclists in Tamale wear helmets because they perceive it to protect them from the serious consequences of road accidents; they want to be protected from serious injuries to their heads and even from death. These considerations were further informed by their own experiences with accidents or having witnessed other motorists involved in accidents when they were not wearing helmets. Therefore, it is clear that these motorcyclists who have decided to wear helmets were not notably influenced by any third-party or external person or thing. Their decisions were made primarily on their own volition and not from any information in terms of education or awareness taught on the dangers of riding motorbikes without helmets. Furthermore, one can conclude that if safety education and awareness are provided, many motorists may adopt the healthy practice of protecting themselves.

Another consideration that influenced the decision to wear helmets was the presence of law enforcement such as the MTTD of the Ghana Police Service at checkpoints on the road. The police serve as deterrents to unsafe or unlawful behaviors on the roads. Motorcyclists afraid of arrest or fines either avoided them when they were not wearing helmets or wore their helmets when they know that the police were at the checkpoints. An interview respondent indicated he does not know the road traffic regulation but, when he was further questioned whether he did not know that he could be arrested for not wearing a safety helmet, he said, "Actually, I know you can be arrested.

But Tamale is a funny place, when you hear police are on the road then you wear it. Some have the safety helmet but will not wear it."

In answering the question "What do you think should be done to encourage motorcycle riders like you to wear safety helmets," a motorcyclist who claims he does not wear a helmet replied thus:

> What I expect city authorities to do is to arrest me when I ride in town without helmet and ask that I park the motorbike and go and bring my helmet. That alone is punishment and not necessarily paying a fee. If I don't have the safety helmet, I will be forced to buy or bring it and come pick my bike. If I am repeatedly arrested and asked to bring my helmet it will help to reform my attitude to wear helmets because I will not want my time to be wasted always.

This clearly speaks to the fact that motorists expect law enforcement to help them do what is right and in the motorcyclists' best interest (i.e., use a helmet). This is how bluntly another respondent puts it:

> Also, the lack of enforcement has encouraged me not to use the helmet in town. I think if the enforcement level was rigorous a lot of riders will have been using safety helmet whiles riding in town even though we don't feel comfortable, but it could cater for the safety part of it.

Some respondents described the treatment they receive from the police as "harassment" as stated by this respondent, "I believe by this, motorcyclists will always wear their safety helmet because we fear the police harassment." Therefore, if a motorcyclist wants to avoid this exposure, he will just wear the helmet to avoid police

"harassment." The motorcyclists have a sense of the legal consequences when they ride without helmets which serves as a consideration to use the helmet. The caveat to law enforcement as an influential factor is the ambivalent effect that those who are arrested tend to not face the punishment, which should serve as a deterrent to themselves and other riders. This is because they have been able to bribe their way out of an arrest or get some politician or opinion leader to get them out. In answering the question, "What do you think should be done to encourage motorcycle riders like you to wear safety helmets?" the respondent answered,

> Proper education, sensitization, and harsh punishment for offenders of the regulation on wearing safety helmets. Because here the only punishment you get when arrested for not wearing a safety helmets is to give a policeman one or two Cedis and you will be released to go. Because of that I prefer paying one Cedi and to move freely than wear helmet and get baldhead.

Another respondent, however, claimed that the money paid to the police was a fine for not wearing a helmet. He says the police will normally seize your motorbike or fine you an amount between 30 Ghana Cedis and 50 Ghana Cedis to pay for not wearing a helmet. However, the police are not to collect any fine; it is the duty of other government agents. Also, the police who collect these "fines" do not give receipts for the amounts received.

Motorcyclists in Tamale also take into consideration the impact that an injury or death will have on their families. As some respondents put it, they "are breadwinners for their families so when they are gone there will be nobody to take care of the families."

The consideration of the welfare of spouse and children and other loved ones can be a great motivation to wear a helmet. When a respondent intimated that he is afraid of injury or death in the case of an accident if he was not wearing a helmet, he was again asked how that further influences his decision to wear helmet, he replied:

> It has a very high rate of influence, very high rate of influence that you should wear helmet in terms of the accidents with the likelihood of death because I have a family. I'm also thinking about the people who depend on me. So, it influences my reasons to wear helmets.

Some respondents also reported that wearing safety helmets actually helped them to concentrate on their riding; specifically, they shared that it reduces distractions and helps concentrate on the road ahead. “The foregoing notwithstanding, when I am on a long journey and my concentration is high, I become comfortable with the helmet.”

Summarizing Research Question 2

> RQ2: What are the considerations in motorcyclists’ decision not to wear safety helmets?

While there were considerations that made motorists use safety helmets, there are also considerations that deterred motorcyclists from using helmets while riding. While the consideration of enforcements will urge motorcyclists to wear helmets, the absence of deterrents or the low representation of enforcements motivates non-adherence to safety helmet use.

The most common consideration that motorcyclists shared in choosing not to wear a safety helmet was discomfort. Almost all the respondents, even those who say

they wear the helmet, complain of its extreme discomfort. The observations made during the data collection period indicated that most motorcyclists did not comply with the road safety regulations of wearing safety helmets. For instance, in the observations at Vittin on the Tamale-Yendi Road, 91.8% of the riders observed on a particular morning did not use a helmet; in the evening, 74% of motorcyclists were not wearing helmets. Similarly, at the King David post on the Tamale-Bolgatanga Road, 85.4% of motorcyclists observed on the morning of 23rd December 2020 did not wear helmets; almost the same percentage of the riders (85%) did not wear helmets that evening. Results at the Shell Filling station observation post on the Tamale-Kumbungu Road were not much different on the 25th December 2020. Specifically, in the morning, 84% of riders were not wearing helmets and, in the evening, 92.6% of riders wore no helmets. Finally, the location on the Tamale-Techiman Road Goil Filling station showed that on the morning of 26th December 2020, 88% of riders did not wear helmets.

Participants expressed more details about the discomfort of wearing helmets; for example, one respondent said, “Honestly, is not too comfortable, sometimes especially when the weather is hot, hot season it’s not too comfortable.” Some riders also complained that the helmet disrupts their hearing. Respondents say that when they wear the helmet, they are not able to hear the sound of other vehicles behind them. Here a respondent complained of the inconvenience caused by the helmet:

> Wearing helmet sometimes when you are riding someone talks to you, you don’t hear. Sometimes when a motorcycle or a car is at the back and it is trying to

> overtake even with the horn sometimes you can't hear as you should. Sometimes I don't feel like wearing it.

Some also complained of great discomfort in terms of heat. The Northern regions of Ghana are extremely hot in the dry seasons during the day times and equally very cold in the night. Hence, the interviewees complained that they feel excessive heat when wearing helmets which sometimes steams vapor to blur their vision and can cause accidents. One participant indicated, "I don't know, and I have not asked my friends, but I think the heat and hearing might be a problem."

Some participants also identified the inconvenience of wearing and keeping their safety helmets secure from theft. For example, one participant provided rich context:

> The other reason that discourages me from wearing the safety helmet is where securely keep the helmet when I get to my destination. Sometimes you leave you safety helmet and goes to transact some business and if the motorcycle is not parked at a place where you park at a fee before you return its either stolen or it falls, and you will not get it. So, to avoid this you must be holding your safety helmet wherever you go which makes inconvenient and uncomfortable. So, this lack of safe place to park discourages me from wearing my helmet in town.

Some also complain of the helmet messing up their hair. While this complaint was reported by both sexes, the female motorcyclists were the majority in this category. Indeed, the observation data indicated that almost all female motorcyclists observed were not using helmets. This was confirmed during the systematic sampling selection of face-to-face interviews as well. Some of the female motorcyclists will give reasons such as

"You know we women we will go and do the hair and like the hair is bigger than the helmet the helmet cannot fix into the head so you will just put it there and you are going." Hence, not willing to mess up their hair, some women will not wear the helmet. Others also explain that sometimes the hairstyle is such that the helmet cannot fit onto their heads even when they genuinely want to use it. This one female rider respondent confirms this by saying, "Simply because I've not done Rasta if I should do Rasta right now, fixing the helmet will be very difficult."

Another factor that influences the decision not to use helmets was identified in the study as ignorance. Ignorance was raised in several contexts, including ignorance of the law, ignorance of the purpose of the safety helmet, and ignorance due to lack of education to remove misconceptions, myths, and others. For instance, some motorcyclists in Tamale sincerely believe that a safety helmet is only needed when a rider is first learning to ride and that perfect riders do not need to continue its use. Hence, they conclude that anyone seen riding around with a helmet is representative of a person still learning or an amateur rider. Surprisingly, others claim that only uncivilized people use the helmet:

> Normally they say that if you are wearing a safety helmet it means you are not civilized. To them they think if they don't wear the safety helmet it means they are civilized and you the one wearing you are rather not civilized. That is how they take it to be.

Indeed, most of these factors can be addressed if there is consistent, targeted, and relevant safety education, awareness, and sensitization directed to the relevant stakeholders.

Summarizing Research Question 3

RQ3: For those who do not wear safety helmets, what considerations would make them decide to wear safety helmets?

In as much as most of the considerations to make a motorcyclist decide to wear safety helmets have already been discussed above, several factors should still be reviewed here. The element of education on road safety cannot be overemphasized. The face-to-face interview respondents voiced the need for educational campaigns to address non-compliance to road safety regulations. This is how one respondent emphasized this point:

> I think education, continues education. Education is just a key. That's, what I can say. Because I don't think it's something that we should be given awards for that because it's for the rider's personal safety and so I think that's the education in all forms in the churches and the mosque, everywhere.

The issue of road safety education is multifaceted. Education must cover the various areas, such as dangers of riding motorcycles without helmets to riders, pedestrians, and other road users. It also must cover education on the road traffic regulations and the penalties and consequences of non-adherence. Further, education should be provided to the public on the interference and effects on the operations of the laws of the country. This education initiative and highlighting of the regulations and penalties must be a collective effort by all relevant and appropriate stakeholders.

The issue of motorcyclists being ignorant of the law must also be tackled as a separate consideration. During the interviews, it became apparent that most respondents

reported only being aware that they were supposed to wear safety helmets. They, however, did not have knowledge of the exact extent of the law nor of the penalties involved in non-compliance. One participant simply stated, “Actually, for that regulation I don’t know it.” Another said, “The regulation is that we should put on helmet or that anybody who own a motorcycle should have a helmet. That is the regulation I know. And if the police get you either they arrest you or advice you.” These two answers typify the rest of the responses recorded during the interview. Stricter enforcement of the law is known to be one of the main factors that encourage compliance. Another factor that will help motorcyclists decide positively to use safety helmets will be the empowerment of the policemen to be independent with the ability and capacity to prosecute offenders without external interference of politicians and rich and powerful opinion leaders.

Summary

Chapter 4 presented and analyzed the qualitative data collected through face-to-face in-depth interviews and observation of motorcyclists on four different spots of major roads leading out of Tamale in the Northern region of Ghana. The results of the analysis were then used to answer the research questions raised in Chapter 1 of the study. Considerations that motivate motorcyclists to make positive decisions to wear safety helmets include the protection that the helmet provides them from head injuries and even death. Additionally, the possibility of encountering police personnel at checkpoints also influences their decision to wear helmets. Further, another consideration in their decision is the potential negative impact that an injury or death would have on their families as they are typically the primary earners in their families.

Considerations in motorcyclists' decision not to wear a helmet largely stem from the discomfort of the helmet, such as it being hot, impairing hearing and vision, and messing up their hair. Other factors include the riders' stated ignorance of the purpose of the helmet and the lack of education, awareness, and sensitization, and the lack of enforcement of road safety regulations. In summary, the factors to encourage helmet use include continuous education, stricter enforcement of the law, and empowerment of the stakeholders to prosecute offenders. Chapter 5 concludes the study and will provide a general summary of the interpretation of the findings. It will also describe the limitations imposed on the study due to various factors, discuss recommendations, and provide conclusions.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

Motorcycles are increasingly becoming the popular means of transport, especially among low-income urban dwellers and the poor (Afukaara, Damsere-Derrya, Peters, Starkey, 2019; Dinye & Ahmed, 2016). Further, motorcycles play an important role in Ghana's transportation system, in the urban, peri-urban, and rural areas, but particularly in Northern Ghana, where they are the most common mode of transport for both humans and goods (Ackaah & Afukaar, 2010). Due to their low cost, convenience, and ability to maneuver on congested roads (Kumar, 2011), motorcycles are also increasingly becoming a common commercial passenger vehicle in major cities in Ghana even though it is illegal (Afukaara, Damsere-Derrya, Peters, Starkey, 2019). The purpose of this qualitative case study research is to explore the reasons motorcyclists do not comply with the regulations/laws on the use of the protective crash helmet in Tamale. The following research questions were designed to enable the researcher to achieve the study purpose:

RQ1. What are the considerations in motorcyclists' decision to wear safety helmets?

RQ2. What are the considerations in motorcyclists' decision not to wear safety helmets?

RQ3. For those who do not wear safety helmets, what considerations would make them decide to wear safety helmets?

This chapter presents an interpretation of the qualitative data collected during field visits through observations and structured face-to-face interviews with motorcyclists

to help answer the research questions related to the factors that weigh on motorcyclists' decision whether to wear safety helmets in Tamale, the Northern Region of Ghana. The findings largely demonstrate the decision regarding safety helmet adherence is multifaceted, and themes include: 1) consideration of economic impact of an injury or death to the rider's family and society; 2) impact of direct or indirect experiences of motorcycle accidents; 3) evaluation of safety helmets' quality, comfortability, and effects on riding experience; 4) knowledge of laws and regulations; and 5) inhibitors to law enforcement such as corruption. Moreover, limitations of the study as well as recommendations and implications for positive social change are also presented.

Interpretation of the Findings

During the initial interview phase of building rapport and context for the respondents, many conversations centered around the affordability of motorcycles leading to increased use of motorcycles in Tamale, especially due to its low cost of operation and ease of use. The cost-effectiveness of a motorcycle is supported by Kumar (2011) and Turkson et al. (2013) and has been recognized as an alternative means of transportation in developing countries; findings by Musah, Marfo, and Akpade (2018) agree that motorcycles present affordable transportation in Africa. Many respondents also mentioned the added advantage of convenience in terms of high maneuverability in the high-density traffic of the metropolis and capability of accessing remote areas not easily accessible by other vehicles, which are findings echoed by previous research (Emiogun et al., 2017; Olubomehin, 2012).

Economic Impact

Supported by the findings of Starkey (2016), the current study also found young male adults are known more than other demographics to ride motorcycles in the Northern region and suggests they were employed across a wide range of the economic sector, with the majority of these riders holding first degree certificates. Moreover, a similar finding was reflected in work carried out by Kudebong et al. (2011), who conducted a cross-sectional cost study of reported accidents in the Bolgatanga Municipality for the year 2008.

Another reason that respondents revealed for not wearing safety helmets was that the motorcycle represents a social status symbol and fashion; therefore, wearing a helmet that will hide the riders' identity and not wanting to be called a villager is undesired. This perception cuts across both genders but is mostly among young female riders and passenger riders. This finding is consistent with other findings in the northern part of Ghana (Ackaah & Afukaar, 2010; Kudebong et al., 2011). This theme of choosing not to wear a safety helmet to avoid obscuring one's identity is not evident in the extant literature and should be investigated. Further, consistent with findings from Dennis et al. (2013), respondents in the current study indicated appearances (e.g., hairstyle, unattractiveness) were barriers to helmet use.

Direct and Indirect Accident Experience

The findings also showed that motorcyclists have a fair idea of the purpose of the helmet. However, some still cling to some unfounded perception that the helmet is only used to protect the rider during the early stages of learning to ride and then no longer

necessary. Motorcyclists also were aware of the serious and potentially fatal nature of accidents resulting from a motorcycle. Respondents also knew that the main injuries from these accidents were head injuries, fractures, lacerations, and contusions. Moreover, the respondents indicated clearly that lack of formal motorcycle riding training, road regulation enforcement, and general education were the major causes of the non-use of helmets. Education, sensitization, and corporate collaboration were agreed as some major means by which the use of helmets could increase among the motorcyclists in the metropolis. Another revelation from the study was that respondents were aware of the high cost of accidents without safety helmets to the individual, family, and society as a whole.

Safety Helmet Experience

Understanding the basic knowledge of safety helmets and their use was established in the current study. Specifically, the study found that motorcyclists demonstrated knowledge of what the helmet is and its importance in protecting the head in the instance of road accidents. Through road observations conducted in the study, it was also found that the general use of the safety helmet is low across areas of Tamale; this finding is consistent with other studies conducted in the country (Dinye & Ahmed, 2016; Kudebong et al., 2011). Similar to findings by Faryabi, Rajabi, and Alirezaee involving motor vehicle victims in a trauma hospital emergency ward (2014), the key reasons that respondents in the current study attributed for their attitude toward safety helmet nonadherence included discomfort from helmet use yielding excessive heat in the

harmattan weather, uncomfortable fit, physical irritation, suffocating feeling, and poor vision or hearing among other issues.

These findings are consistent with Seidu et al. (2017), in which some motorists claim to not wear their safety helmets due to were impaired hearing ability, the potential to induce headache, and the distance of travel (e.g., less likely to wear a helmet in short commute). Moreover, similar to Dennis et al. (2013), respondents in the current study reported short distances and the cost of safety helmets were barriers to helmet use. It is difficult to reconcile that while respondents correctly and adequately defined and explained the purpose of the safety helmet (i.e., helmets save lives and prevent injuries), there was a lack of translation of that understanding to actual helmet usage. The non-use of safety helmets among motorcyclists can therefore also be attributed to poor discipline on the part of riders and could potentially result from the lack of enforcement and safety education. This attitude must therefore be improved to save lives and property (Boldol & Zalat, 2018).

Knowledge of Laws and Regulations

In the current study, motorcyclists displayed very minimal knowledge of the Road Safety Regulations in Ghana. Many of the interview responses identified not knowing the specific consequences of not wearing a safety helmet, but when legal repercussions were identified, the responses varied greatly among respondents. This theme of minimal knowledge contrasts sharply with those made by Konlan and colleagues (2020), who studied commercial motorcyclists in the Adidome district of Ghana, showing that about 90.4% of commercial motorcyclists knew about road traffic regulations. This finding

reinforces the need for the National Road Safety Authority and other stakeholders (e.g., driver and vehicle licensing authorities) to collaborate and implement realistic measures to reduce this disregard for fully understand and adhere to the applicable laws. Furthermore, the study reveals that the lack of enforcement of road safety regulations is a major cause of the non-adherence to the use of helmets.

Inhibitors to Law Enforcement

Ghana has adequate provisions in the Motor Traffic Act, 2004 (Act 683) as amended in 2008, Act 761 that requires motorcyclists and passenger riders to wear safety helmets. The absence of enforcement agents on the road to enforce the wearing of helmets is a major issue as found by many previous studies (Aidoo, Bawa, & Amoako-Yirenkyi, 2018; Dennis et al., 2013; Dinye & Ahmed, 2016; Fletcher, McDowell, Thompson, & James, 2019; Musah, 2018; Wei, 2016). Dinye and Ahmed (2016) especially noted that motorcyclists in Wa, the Upper West region of Ghana, perceive the wearing of a helmet as "unwarranted and unnecessary," and motorcyclists would only use the helmet when there is a police presence on the road or on long-distance traveling. The current study findings further indicate that high-level interference occurred with the enforcement of the regulations in the event of perpetrators being arrested.

Bribery and corruption were issues noted by Adnan and Gazder (2019), who were worried about the attitude of traffic police and their image, which needed to be improved in relation to dealing with enforcing the road law and administering punishment to violators. Highly placed politicians and opinion leaders intervene to release culprits who violate the law. This finding is supported by Dinye and Ahmed (2016), who refer to the

practice as “negative interference” from multiple parties, including predominantly politicians, the civil and public servants (e.g., administrators and directors), the clergy, and even the traditional authorities in the work of relevant institutions in the development of the settlements. Participants indicate that it is hypocritical of the very people who are asking for the autonomy of public institutions to then perpetuate the same crime. The law enforcement agencies are constrained due to low budgetary allocation, inadequate personnel, and other legal issues (e.g., conflicts, thefts, robbery), leading to the low presence of police in the communities. However, the law enforcement agencies need to overcome these setbacks and improve their efforts by increasing their presence in the communities. Hence, the study confirms the work done by Kudebong et al. (2011), who identified low manpower of the law enforcement coupled with competing social problems (e.g., robbery, theft, and conflicts) requiring equal attention and resources.

Limitations of the Study

The purpose of the study was to collect data from sampled motorcyclists in Tamale Metropolitan area. However, the face-to-face interview data seems to be more reflective of private motorcyclists than a cross-section of all motorcyclists. This may limit transferability to all motorcyclists in terms of private compared to commercial riders. Additionally, great reliance was put on international sources of literature as local research is limited. This may cause some discrepancies in representation to the appropriate population.

Recommendations

It is recommended that law enforcement should increase their enforcement responsibilities on the use of safety helmets in the Tamale metropolis. Not only is this recommendation based on the current study findings, but Luchidio (2015) reported a 7% drop in traffic-related accidents in 2011 in Kenya after the Kenyan government intervened with the implementation of strict measures on motorcyclists in 2010. Moreover, Peltzer and Pengpid (2014) recommended stricter enforcement of mandatory helmet laws for two-wheeler riders (e.g., both drivers and passenger riders) after a study of stricter law enforcement in some Association of Southeast Asian Nations (ASEAN) countries showed that it was very effective. There were a number of responses in the current study that demonstrated law enforcement agents were not living up to their legal mandate. Simultaneously, enforcement was deterred by interference from other stakeholders, particularly traditional authorities, politicians, and community leaders, who should support law enforcement in their duties to enforce helmet use in Tamale. For example, a respondent said, "And sometimes when the MTTD wants to press charges against offenders, politicians and opinion leaders will intervene to get the offenders released. So, these kinds of interventions and interference in the work of the MTTD make some of our motorcycle riders in Tamale think not wearing safety helmets is normal".

Another recommendation is that the metropolitan Assembly of Tamale should enact a by-law making it mandatory for motorcycle dealerships within Tamale Metropolis not to sell motorcycles without safety helmets. The safety helmet must be sold as an accessory of the motorcycle to consumers similar to the wheel spanner and other

tools of the motorcycle. This recommendation is derived from the majority of respondents indicating that selling motorcycles in Tamale without safety helmets was a contributing factor for some motorcyclists to not wear a helmet. Particularly, one respondent shared, "…police should ensure that motorbike dealers sell motorbikes with the helmets". Another respondent's view was that:

> My addition is that anybody who buys motorcycle or the person selling motorcycle must add the price of the safety helmet to it and also advise the buyer to always use the helmet. Anybody who buys a motorbike should be given a brochure detailing the safety precaution necessary for operation of the motorcycle.

Moreover, it is recommended that the regulation on child safety helmet use should be highly enforced because children are more vulnerable than adults. There were some responses of the lack of enforcement of the law on child safety helmet use; similarly, during the observation data collection, the researcher observed adults (e.g., parents or relatives) carrying two or more children on a motorcycle of which none wore a safety helmet. To mitigate this safety hazard, a respondent indicated, "… Also, the law enforcement should ensure motorcycle with passengers have safety helmets for the passengers too including children".

There is a need for continuous and aggressive public education on the use of safety helmets as well as publicizing the law on safety helmet use described in the Road Traffic Regulation of Act 683, Section 16. The majority of respondents attributed the non-use of safety helmets to low public education and lack of sensitization to the value of

using safety helmets. Most respondents believed that if public education on the use of road safety was rigorously using all forms of communication (e.g., print, electronic, radio, social media, television, and community engagement through drama), the use of safety helmets could be improved. Responding to the research question regarding factors for why motorcyclists do not use safety helmets, one respondent said, “I think public sensitization is not enough. I feel sometimes people don’t use safety helmets for lack of education. Just telling people to wear safety helmets without explaining the reason why they should do that I think is a problem. When motorcyclists are sensitized just like this interview we are having, at the end of the day it will encourage me more to wear the helmet.” Furthermore, one respondent indicated the lack of understanding some riders have for the importance of the safety helmet for their own safety; in other words, these riders just carry the safety helmet for show to appease law enforcement rather than for their own injury prevention. Specifically, the participant stated:

> I think education and sensitization should be encouraged or promoted. Because what I have noticed is that around here many people think wearing a helmet, you see once you go to town and see many people wearing a helmet it means there is an operation too to surcharge people. A police operation to charge people who are riding without helmet. It means that they wear the helmets not for themselves, they don’t see the need to wear it. They wear it because police are on them. So, if the police leave the road, they don’t wear it. Sometimes you see people riding with the helmet hanging either at the back or front of the motorbike and not on their heads. So, I think people don’t really understand why they wear the safety

> helmet. Security people who are supposed to check this should be equipped well to do their job.

Another participant indicated that "Education is one to the youth who are using motor bikes. We encourage such education on radio, television and FM stations to encourage people to use helmets because it protects this our heads during motorcycle accidents thereby preventing needless deaths and injuries." Moreover, to increase the potency of an education initiative, there is a need for further research on the effect of helmet use and fatality resulting from motorcyclists' non-use of helmets. This recommendation is based on participants' responses such as:

> My experience as a nurse shows that most of the accidents in the Tamale Teaching Hospital (TTH) is motorcycle related. Also, most of the deaths are related to motorcycle accidents. In my department, there are a lot of accident patients and majority of them are motorcycle accident victims. We take the opportunity to talk to the accident patients and educate them to use their helmets and also observe road traffic regulation.

Findings from such research will provide empirical evidence to support and help convince motorcyclists to wear safety helmets.

Lastly, it is recommended that the city authority enacts a by-law to the effect of enforcing a "no safety helmet no entry" policy for places related to public institutions such as schools, places of worship, markets, and lorry stations. Such regulations will contribute to enhancing the use of safety helmets in the metropolis. For example, a respondent said that:

> I use safety helmet always because I work with soldiers and their instructions requires that if you have no safety helmet you cannot enter the barracks. Also, where I attend church has a policy that requires all that enter the church premises to have helmets. Because of this I am always in my helmet wherever I go.

More directly, one participant indicated, "And there should be collaboration among stakeholders as well. The police cannot do it alone, we need the traditional authorities, religious and opinion leaders to help the police in this fight."

Implications

The use of motorcycles as a means of urban transportation has both negative or positive effects (Olubomehin, 2012). Further, the predominant demographic of motorcycle riders include economically productive males (Matheka, Omar, Kipsaina, & Witte, 2015; Kudebong et al., 2011). Consequently, the decision to forego wearing a safety helmet has consequences not only for the individual motorcyclist but also for their family, community, and government.

Individual motorcyclists involved in an accident without wearing a safety helmet could die, suffer a lifelong injury, or possibly only suffer minor injuries if lucky. These motorcyclists involved in an accident could be parents, breadwinners for their families, or some other major family role in which their death would bring hardship to their families and negatively impact the futures of their dependents. A respondent had this to say:

> There is a lot society can benefit when motorcyclists wear safety helmets. When you use safety helmet and get accident you will be protected as an individual and society will be calm and happy because everybody will have free mind to school

> and free mind to think because you don't have any damage to your head. That is very critical and then you can take decisions and make progress in your region or district. You can talk and think deep because you don't any problem in your head because of the use of helmet.

Also, families suffer when their children or family members get involved in a motorcycle accident; for example, the cost of medical bills and care of the spouse and children if the accident victim is married. Severe or fatal head injuries could be minimized if motorcyclists were to use helmets, thereby minimizing the negative consequences for their families. For example, one participant stated, "It will prevent injuries and fatalities and if by wearing safety helmets will prevent deaths and head injuries people will be safe. They will not be injuries and deaths, lives will be preserved, and there will be increase productivity".

Communities look up to certain individuals for development. Such persons are human resources and role models for the youth in such communities. The death or permanent disability of these individuals do not only rob families of their loved ones but the community of this human resource. To this point, one respondent said:

> I think human life is a precious thing to have. So, you can imagine how many people die on our roads from motorcycle accidents. So, if these people had helmets on most of them could have survived. And so, accidents are inevitable, they occur every day. But we can avoid some deaths from these accidents. So, these are our population, and they are our human resources that are taken away by these accidents or unnecessary deaths. So, if these helmets use are encouraged and

> we are able to safeguard our people, I think we will be able to maintain our human resources. And these will go a long way to sustain our growth and development as a people.

Also, these fatal and severe accidents impact government in many forms. For example, the government needs to buy medicine, provide ambulances, and hire specialist doctors. Some of these financial resources could be saved if more motorcyclists could adhere to the use of safety helmets. Further, the loss of citizens through death or permanent head injuries prevents Tamale and Ghana from fully realizing the human resource potential as some of the motorcycle accident victims are skilled and trained personnel. One respondent said:

> I was saved by my helmet when I had accident few years ago. If I was not in helmet, I would have been dead by now. So, safety helmets prevent head injuries and fatalities and if by wearing safety helmets will prevent deaths and head injuries people will be safe. There will not be injuries and deaths, lives will be preserved and there will be increase productivity. Now I am working and contributing to production in Ghana and my family are not dependent on anybody.

Conclusion

This study revealed that motorcycles are continuing to become a major vehicle of choice due to affordability, convenience, and maneuverability amongst other benefits by mostly the economically productive male population. However, there is also a high level

of non-adherence to the use of safety helmets by motorcyclists, which leads to a variety of negative social, economic, cultural, and even political implications.

Study results demonstrated that the majority of motorcyclists do not wear safety helmets as stipulated by the road safety regulations. Riders provided the following reasons for this non-adherence, including discomfort in the helmet use (e.g., excessive heat, lack of fit), negative effect on appearances (e.g., messing up of hair, not wanting to be called a villager), and lack of regulation enforcement (e.g., limited resources, corruption) by the state institutions. The road safety agencies are accused of not effectively providing law enforcement with safety helmet use. Moreover, the agencies are accused of not providing effective public education to achieve a meaningful understanding of the road traffic regulations and practical adherence of motorcyclists to wear safety helmets. The study revealed that motorcyclists knew it was illegal not to wear safety helmets when using a motorcycle; however, widely varying responses were provided regarding the safety helmet regulations and consequences of non-adherence.

To achieve enhanced adherence to safety helmet regulations, the Tamale Metropolitan Assembly should enact laws such as ensuring motorcycle dealerships sell motorcycles with helmets as a package deal. Also, a ‘no safety helmet no entry’ policy should be adopted by the Metropolitan Assembly to increase the use of safety helmets and ensure more consistency in the requirement and enforcement of safety helmet use. Improving the law enforcement within the metropolis should be supported to enforce the laws and regulations without undue interference from traditional authorities, politicians, and opinion leaders. The Regional Road Safety Authority is needed to provide an

aggressive public education initiative to continuously educate and reinforce the importance of safety helmet use and meaningful personal use benefits through various mechanisms of spreading the awareness.

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Appendix A: Observation Checklist

	Helmet Use		**Gender**		**Age**	
Motorcyclist	N	Y	M	F	Under 30	30+
Rider	N	Y	M	F	Under 30	30+

Engine Size	<100 cm3			100+ cm3		
Traffic	Light		Medium		Heavy	
Vehicles	Car	Truck	Motorcycle	Mixture		

Day of week	Weekday			Weekend		
Time of Day	Morning		Afternoon		Evening	
Road	Yendi	Bolgatanga	Kumbungu		Techiman	
Road Type	Minor			Major		
Speed Limit	No Limit	20	Under 60		60+	
Observation	Location	Blind spots	Is it flat	Any side streets	Bridges	Stoplights

Notes:

Appendix B: Interview Guide for Motorcycle Riders

Date:

Time:

Interviewee Code Number:

Location of Interview:

Interview Preamble

My name is Mohammed Wumbei, a PhD student from Walden University. You are being invited to participate in a research study on adherence to motorcycle use regulations among motorcycle riders in Tamale. The purpose of this study is to find out the reasons for use or nonuse of helmets, understand ways to encourage the use of helmets to avoid or reduce head trauma injuries among motorcycle riders in Tamale. This interview will last for about 30 minutes. After the interview, I will organize the responses for analysis, and some of your answers may be shared with my University's Research Review Committee members. However, I will not identify you personally in my documents, and no one will be able to identify you by your answers. Also, with your permission, I would like to audio record the interview because it may be difficult to write or understand everything you will say now. Your participation in this study is completely voluntary and you can stop the interview at any point if you no longer to participate. If you have any questions as we go through the interview, please feel free to stop me and ask. It is very important that I collect honest answers. It is of the upmost importance to answer as you honestly feel. There are no wrong responses. Do you have any questions? Are you ready to begin?

Demographics

1. Age:
2. Sex:
3. Occupation:
4. Level of Education:

Building rapport and context

- Why have you chosen to ride a motorcycle?
- Why choose a motorcycle over other modes of transportation?
- What do you like most about riding a motorcycle?
- How long have you been riding a motorcycle?

Regulations and use of helmets

- In your view, what is a safety helmet?
- What do you think the motorcycle safety helmet is meant to achieve?
- What do you know about the road traffic regulation that requires wearing of safety helmet in Ghana?
- Do you wear a safety helmet?
- If you do, how often do you wear your safely helmet?

RQ1. What are the considerations in motorcycle riders' decision to wear safety helmets?

- What is your strongest reason you feel wearing a safety helmet is necessary?
- How comfortable and safe do you think is your safety helmet for motorcycle operations?

- What other reasons do you think would promote wearing a safety helmet among riders in Tamale?

RQ2. What are the considerations in motorcycle riders' decision not to wear safety helmets (for those who do not wear protective safety helmets)?

- What is the strongest reason for you not to wear a safety helmet?
- What other reasons do you think discourage riders from wearing a safety helmet?
- What factor would most likely influence your decision to wear a safety helmet?
- How do these reasons given above affect your decision not to consistently use a helmet while riding your motorcycle?
- What do you think should be done to encourage motorcycle riders like you to wear safety helmets?

Social change

- In your view, how will the use of safety helmets impact society?
- Do you have any other information to add that will be useful to improve on motorcycle transportation?

Closing

- Thank you for your answers. Do you have anything else you'd like to share?
- Do you have any questions for me?
- Thank you for your time. Your responses will help greatly in finding appropriate ways to encourage the use of helmets among motorcycle riders to prevent head trauma injuries and save the lives of motorcycle riders in Tamale and Ghana as a whole.